QUICKSTUDY
Authentication: How your computer knows you really are you. Page 77

SUPPLIER BEWARE
Online marketplaces have risks for suppliers, price erosion and lower profits among them. Page 6

SECURITY JOURNAL
"Pat" scores some easy points, checks out his ISP and tries his hand at policy-making. Page 76

COMPUTERWORLD

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MARCH 27, 2000 ■ VOL. 34 ■ NO. 13 ■ $4. COPY

[We'll] concentrate on finding better ways to ... manage data for customer support.

PAUL RUGANIS,
VICE PRESIDENT OF INFORMATION SERVICES,
ROCHESTER GAS AND ELECTRIC

FORREST McMULLIN

DATA IS KING

WHAT'S THE TOP PRIORITY of technology managers in corporate America? Data management, according to an exclusive *Computerworld* survey on IT spending plans. Cynthia Morgan reports that IT buyers want database applications that can scale up dramatically and connect to e-commerce sites, as well as storage-area networks to handle growing volumes of data. Other high priorities include replacing older desktop PCs, providing high-speed Internet access to telecommuters and implementing security.
Story begins on page 82.

SPENDING SURVEY

3COM DUMPS ENTERPRISE; USERS MIFFED

User companies worry that investments in LAN infrastructure are now at risk

BY JAMES COPE

3Com Corp. stunned network users and analysts alike last week with the breadth of a restructuring that will phase out its entire big-enterprise switching business by the end of June.

The Santa Clara, Calif., company announced that it will discontinue its CoreBuilder LAN switches and all big-iron networking gear, including its PathBuilder and NetBuilder products. 3Com said it will instead focus on more growth-oriented lines of business.

Large-scale users said they felt abandoned, and several expressed disbelief that future upgrades will be coming from a vendor they said they had never heard of.

"This was a big blow to us," said Brian Wilson, a network engineer at Ohio State University's Fisher College of Business, which built a showcase network using 3Com's Core-Builder LAN switches.

"We invested all of this mon-

IBM SCALES UP LINUX INITIATIVES

But some fear that direction may squeeze other projects

BY DOMINIQUE DECKMYN

IBM has revealed further steps in its commitment to Linux, parts of which may make AIX users a little uneasy.

Last week, the company announced that it's delivering a 256-node Linux cluster to the

More on Linux Inside
■ Competition with Linux takes its toll on SCO. Page 32

■ Despite Caldera's strong debut, Linux IPOs no sure thing. Page 32

University of New Mexico in Albuquerque. While discussing the deal with *Computerworld*, Dave Turek, IBM's vice president of deep computing, said it would be the precursor to a packaged Linux cluster for

WEB-BASED SUPPLY CHAINS DRAGGING

Early adopters proceed with caution, cite prerequisites

BY CRAIG STEDMAN
LAS VEGAS

Since December, Ace Hardware Corp. has launched supply-chain collaboration projects with four manufacturers, in an effort to cut costs and im-prove its ability to fill product orders from retail stores that use the Ace name.

Four more manufacturers are expected to join by May. But the Oak Brook, Ill.-based retailer is keeping the collaboration project small for now because of concerns about opening its mainframe-based

JUST THE FACTS

Supply-Chain Collaboration

What it involves: Groups of retailers, manufacturers and suppliers using the Internet to exchange business data and to jointly develop demand forecasts, production schedules and inventory replenishment plans

Potential benefits: Higher sales; reduced inventory and production costs; shorter product development and manufacturing cycles; improved ability for manufacturers to customize products for different buyers

Challenges for users: Establishing enough trust to share sensitive business information among companies; defining common ways of doing business; upgrading internal business applications to support Web-based collaboration

NET TAX DEBATE STILL UNRESOLVED

Congressional commission fails to reach agreement

BY PATRICK THIBODEAU
DALLAS

The failure of a commission appointed by Congress to reach an agreement on Inter-net taxation last week didn't upset Joe Dittmar's world of tax applications.

Dittmar is the e-commerce applications manager at clothing retailer Abercrombie & Fitch Co. in Reynoldsburg, Ohio, and stores like his were
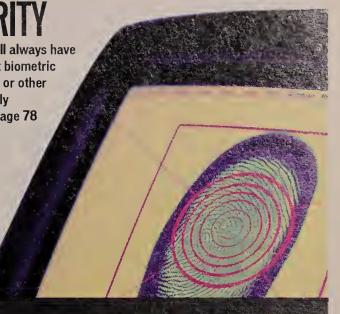
NEWSPAPER

BIOMETRIC SECURITY

You may lose your password, but you'll always have your finger. In Exec Tech, we find that biometric security gear, which uses fingerprints or other physical characteristics, is increasingly affordable, reliable and easy to use. Page 78

THE REAL BOTTOM LINE

There's more to a company's worth than its balance sheets show. Skandia's Scott Hawkins uses IT to calculate the financial services and insurance company's intellectual capital. Page 58

TRACEY KROLL

COMPUTERWORLD THIS WEEK

MARCH 27, 2000

> YOU DON'T WANT THE GROUP TO BE COMATOSE, AND YOU DON'T WANT THEM TO BE PSYCHOTIC.

JIM HIGHSMITH, AUTHOR AND SENIOR CONSULTANT AT CUTTER CONSORTIUM, ON THE CHALLENGE FOR WEB PROJECT DIRECTORS TO CREATE THE RIGHT ENVIRONMENTS FOR THEIR TEAMS. SEE PAGE 64.

www.computerworld.com

AT DEADLINE

Loss of White House E-Mails Scrutinized

The White House came under scrutiny by the House Government Reform Committee last week after a disclosure that lost e-mails could have contained evidence relating to the travel office, campaign finance and Monica Lewinsky scandals, according to published reports.

A glitch in the White House's e-mail server allegedly allowed incoming Internet e-mail messages to go undetected by the record management system that searches text in response to subpoenas. Contractors hired by the White House to implement the server attributed the glitch to case-sensitive search limitations in the record management system.

Baan Loses Another Director

Baan Co. last week said another member of its supervisory board has resigned, making him the third board member this month to give up a seat. Henk van den Breemen, a former general and chief of staff in the Dutch Armed Forces, resigned because of health reasons, Baan said. He had been a member of the supervisory board – the European equivalent of a U.S.-style board of directors – for 12 months.

The latest resignation comes three weeks after two U.S.-based members stepped down after nine months on the board of the Putten, Netherlands-based company.

EMachines Goes Public

Low-price desktop PC vendor eMachines Inc. went public last week, trading on the Nasdaq exchange under the symbol EEEE. After getting off to a slow start Friday, midday trading volume in eMachines surged to 11 million shares, with the share price hovering just below the $9 offering price. The company's initial public offering is for 20 million shares of common stock.

Irvine, Calif.-based eMachines is a joint venture between South Korean PC maker TriGem Computer Inc. and display maker Korean Data Systems Co. EMachines has offered computers, without monitors, for as low as $399.

Cost, Kludginess of Wireless Web Impeding Adoption

Analysts say consumers doubt advantages

BY BOB BREWIN

ANYONE planning to make a fortune in mobile e-commerce — the new-millennium version of last year's dot-com frenzy — needs to think again, according to a hype-busting report from Ovum Inc., a consulting firm based in Wakefield, Mass.

The report discounted consumers' enthusiasm about relentless announcements of new mobile wireless services and warned wireless wannabes to focus on business users and "genuinely unique" consumer services.

Dennis Brown, co-author of the Ovum report, said even business users "won't pay a premium for existing [wireless] services, which are easier and cheaper to access using their phone or PC." Brown stressed that "if suppliers are to survive and prosper in the long term, their early offerings will have to be very targeted and very compelling."

Broad Points Ring True

Other analysts, along with wireless Web carriers and application service providers, agreed with some of the broad points in the Ovum report.

Referring to wireless banking, Iain Gillott, an analyst at International Data Corp. in Austin, Texas, said, "Few people want to transfer funds over Sprint PCS today" because of concerns about security and the ease-of-use limitations of existing wireless devices.

Gillott said the industry needs to back up and figure out how to best serve both businesses and consumers with simpler applications.

In banking, he said, this could mean "a notification service that my checking account balance had dropped to $100. Then I could go to the ATM and transfer money from my savings account."

Jim Ryan, director of applications and content at Sprint PCS Group in Kansas City, Mo., agreed that "there's a lot of hype in this space." But, he added, "at Sprint, we don't announce anything until it is real."

According to Ryan, Sprint PCS has already signed up several corporate clients, including a "substantial" number of users who have hooked their office system into the company's wireless Web service. He declined to identify any of those users, however.

Consumers, Businesses Learn

Mike Mills, vice president for business development at Aether Systems Inc. in Owings Mills, Md., also backed the Ovum report. Aether Systems, a provider of wireless application services, has developed several business-to-business applications.

"That report made a lot of valuable points," Mills said. "The challenge for business users is to learn about the realities and sift out the hype."

Transportation logistics — essential to e-commerce — is one area ripe for exploitation, since delivery services need, rather than want, the wireless access to data that Aether is pursuing, Mills said.

Management of salespeople — typically mobile workers — is another area that Aether intends to address as an application service provider, according to Mills.

As for the hype, Mills, a former reporter for *The Washington Post*, where he covered the telecommunications industry before joining Aether last year, just laughed. "Of course there's hype," he said. "There's hype about anything connected to the Internet." ▶

Web Content Distribution Gets New Options

Technology speeds page download time at browser level

BY JAIKUMAR VIJAYAN

Companies looking for ways to speed up content distribution and delivery over the Web got more options last week.

Start-up Fireclick Inc. in Los Altos, Calif., last week launched a service that uses a predictive caching technology to reduce the time it takes to download a Web page.

Fireclick's software, called Blueflame, uses real-time clickstream data (a client's usage patterns) and probability analysis to predict which elements of a page — such as a logo or a graphic — are most likely to be next requested by the user. It downloads these elements to the user's browser cache, one step ahead of the next mouse click, thereby speeding page delivery at the browser level.

Services like these are crucial for improving download times at graphics-intensive sites, said Cheryl Austin, CEO of beta-tester Intermallamerica.com, a Houston-based Web service that hosts e-commerce-enabled shop fronts for midsize and small businesses.

"It is unique in that it anticipates pages that an end consumer is likely to request and preloads it to the browser so that it is ready and waiting when the user requests it," she added.

Fireclick is the latest in a growing list of vendors offering similar, though not always identical, content distribution services. Among the more high-profile companies are Akamai Technologies Inc. in Cambridge, Mass., and Digital Island Inc. in San Francisco, both of which boast a large roster of big-name clients.

Another relatively new entrant is Boston-based Adero Inc., which last week purchased Dedham, Mass.-based Starburst Software for an undisclosed amount.

Starburst, whose customers include General Motors Corp., Wal-Mart Stores Inc. and Kmart Corp., provides services that help companies deliver content such as video, audio, business reports, databases, graphics and software to distributed devices such as Internet Web servers, kiosks, automated teller machines and television set-top boxes.

Starburst's services will complement Adero's Global-Wise service, which speeds performance by caching static, dynamic and streaming Web media closer to the end user.

Quicker Access Overseas

"The service allowed for a painless mirroring of our sites overseas, so that international customers have quicker access," said Joe Dunnigan, president of BigDeal.com, an online supplier of winter sports equipment in Phoenix.

Approximately 15% of visitors to the BigDeal site are overseas customers. Since trying Adero's service, response time to such users has improved significantly, Dunnigan claimed. ▶

Unicenter Helps RadioShack Stay Plugged In.

NEWS

It's 'Supplier Beware' Online

They earn less profit, face more competition in digital exchanges

BY JULIA KING
AND JAIKUMAR VIJAYAN

"BUYER BEWARE" is the saying, but increasingly, it's the suppliers who must watch their bottom lines while doing business at online marketplaces.

Consider Molecular Probes Inc., which sells specialty chemicals both directly to research scientists and online via www.Chemdex.com and www.SciQuest.com. Off-line sales net a profit of between 10% and 15% for the Eugene, Ore., supplier. Most online sales, by contrast, bring in just 5% because there's a 5% cut to the online marketplaces.

"There's definitely not as much benefit online from the supplier's side as from the buyer's side. The No. 1 reason we do it is as a convenience to customers" who want one-stop online shopping, said Molecular Probes product manager Ian Johnson.

The "suppliers are getting squeezed," said Steven Kafka, an analyst at Forrester Research Inc. in Cambridge, Mass.

Price erosion, triggered by the effortlessness of comparison shopping online, and the challenge of finding a way to differentiate their products and services from thousands of competitors' listings on the same exchanges are also big dilemmas for suppliers.

It's also not at all clear that a significant number of suppliers' customers are ready or willing to do business online. Firms currently doing business online report that this form of commerce provides less than 5% of their revenue, according to a recent study by PricewaterhouseCoopers. The users also list the low use of e-commerce by customers as one of the major barriers to electronic business.

"Some of our customers now don't even want to use the telephone or fax machines. They want a salesperson standing in front of their desk every Monday morning with a box of doughnuts," said David Hannah, president and CEO of Reliance Steel & Aluminum Co., a $1.5 billion Los Angeles-based supplier of metal products. Yet Reliance sells its products online at www.Materialnet.com, which Hannah describes as "another tool and an extension of our sales force."

HANNAH: Customers want doughnuts

There's also the expensive and highly complex task of integrating suppliers' enterprise systems with those of the multiple exchanges cropping up in virtually every industry.

In the past six months, for example, more than a dozen new exchanges have appeared in the oil industry. And the printing industry is up to more than 20 online marketplaces. Until a clear winner emerges in their particular industries, suppliers are more or less forced to sign on to several or all of them, analysts said.

"If a company is a supplier to Kmart, Target and Wal-Mart, it's likely [it will] need to be on several exchanges, and it takes time and resources to post [electronic] catalogs to different sites plus integrate back-end systems," said Gene Alvarez, an analyst at Meta Group Inc. in Stamford, Conn.

"The announcements make things sound so simple, but it's not simple. There's a lot of things under the covers," Alvarez said.

No Automatic Rewards

It's also a mistake for suppliers to assume that simply participating in a digital marketplace will automatically open up new markets and bring new customers, said David Krauthamer, director of information technology at Advanced Fibre Communications Inc., a maker of telecommunications equipment in Petaluma, Calif.

For example, in the manufacturing arena, the vast majority of business-to-business buying involves products that are custom-engineered to rigid specifications and sourced from one or two prequalified suppliers, Krauthamer said.

Big Suppliers Rule

"If you are a Ford or a GM, you are not quickly going to start buying from a small company" just because it's listed in a digital marketplace, said Andy Chatha, president of ARC Advisory Group Inc., a consultancy in Dedham, Mass.

"Support is very, very important. [So] such companies are going to continue buying [critical components] from big suppliers," he said.

Despite this, there is a crucial need to maintain a presence in these exchanges if only for the wider marketing visibility they promise, said Andy Andrews, an export sales manager at Paratherm Corp., a Conshohocken, Pa.-based manufacturer of specialty heat-transfer fluids.

Andrews doesn't see much value in compromising margins — and risking commoditizing his products — by participating in online auctions just to attract new customers.

The goal of participating in these exchanges is to deliver more information and make potential buyers "realize that these are [differentiated] engineered products" requiring postsales support, said Andrews. The only way to maintain margins in these exchanges is "to try to promote a dialogue rather than simply attract new customers," he said.

New Tools May Make E-Life Easier

New tools designed to help suppliers operate more efficiently at online exchanges are beginning to trickle into the market.

Maxager Technology Inc. in San Rafael, Calif., has announced software that enables suppliers to calculate their costs and profit in real time while simultaneously bidding at online exchanges. The software identifies which contracts are potentially the most profitable and flags the lowest price a supplier can bid and still earn a profit on net assets based on real production costs.

Users of the software, which takes four weeks to install and is priced at 1% of a plant's revenue over three years, include Schaumburg, Ill.-based Motorola Inc., Chicago-based Nippon Steel U.S.A. Inc. and Toledo, Ohio-based Dana Corp.

Also on the sales side. New York-based InterWorld Corp. is taking aim at the differentiation issue with software that enables suppliers to automatically upload their entire catalogs – including specific branding and promotional data – to several different exchanges, such as Walnut Creek, Calif.-based Commerce One Inc.'s MarketSite.

Delray Beach, Fla.-based Wiznet Inc.'s business-to-business site puts suppliers' full catalogs online, enabling buyers to search millions of products, ranging from adhesives to telecommunications systems, by dozens of parameters other than price.

David Yockelsen, an analyst at Meta Group Inc. in Stamford, Conn., said suppliers can expect more such products in the coming months. "We'll start to see tools made available to suppliers so they can get real-time analytics about what's happening in a Net market and how that relates to what's going on with their own production," Yockelsen said.

Without them, companies whose products are compared online by price alone "are going to lose more and more margin," he said. "Suppliers will wise up about that." – *Julia King*

Smaller Players May Benefit the Most

MASTER DESIGN'S KEVIN CAMPBELL nearly halved his sales commission costs

For now, the biggest beneficiaries on the seller side of the digital exchanges seem to be small and medium-size suppliers.

Kevin Campbell, president of Master Design and Manufacturing Inc., a $5 million custom metal fabrication company in Noblesville, Ind., has found new business on www.suppliermarket.com, which has helped keep his 80,000-sq.-ft. plant running at full capacity.

He has also nearly halved his sales commission costs by paying a 4% fee to the exchange vs. a 7.5% commission to a traditional salesperson.

"Salesmen are expensive if you're paying salary and expenses, especially the way hotel prices and gas prices are escalating and airline tickets are going up," Campbell said.

"So the fact that I can sit at a computer for $19.95 [per] month and quote millions of dollars worth of work I find pretty exciting," he said. "You could have a staff of 500 salespeople, but there's no way they could cover the whole country and Canada."

But bidding the right price online – as in the real world – "is still really kind of a crapshoot," Campbell said. "You hope you can do it for what you say you can do it for." – *Julia King*

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NEWS

BRIEFS

Petrochemical B-to-B Marketplace

A global consortium of chemical and petroleum companies last week announced plans to launch a business-to-business electronic marketplace called Envera. By the third quarter, trading members will be able to buy and sell products and will have access to links to global financial institutions, shipping companies and other key service providers.

Online Marketplace Recruits Members

Two more European retailers have signed on to be equity partners in an online marketplace that Oracle Corp. is setting up with Sears, Roebuck and Co. and Paris-based Carrefour SA. The new participants are Metro AG, a German retailer with annual sales of $42 billion, and J Sainsbury PLC, a London-based company that owns Shaw's Supermarkets Inc. in the U.S.

More Women Are Logging On to the Web

A nationwide survey found that women are logging on to the Web in growing numbers and are driving the growth of Internet use in the U.S. By the end of last year, 106 million people – 53% percent of the U.S. adult population – were online, and 60% of those people accessed the Web every day, according to a survey by The Strategis Group in Washington. Internet use has grown by 25% since 1998.

The number of women using the Web has tripled in the past two and a half years, and 49% of all Web users today are women, according to the survey.

Congress Fights Spam

A congressional subcommittee approved a bill that would prohibit spammers from sending more e-mail after recipients have asked to be removed from distribution lists. Among other provisions, the bill forbids collecting e-mail addresses from Internet registrars, requires accurate return addresses on unsolicited commercial e-mail and allows users to sue spammers.

Image Server Helps Ford Manage Media Assets

Converts logos, photos for the Web or print

BY LEE COPELAND

ATLANTA-BASED Iterated Systems Inc. will announce this week that its new graphics image server is in use at Ford Motor Co. in Dearborn, Mich.

Available next month, Iterated System's MediaBin 1.0 image server stores and retrieves digital images, and converts the images into different formats and resolutions for use on the Web or in print. MediaBin supports a variety of image formats, including Tag Image File Format, graphics interchange format, JPEG and Adobe Photoshop files. It requires Microsoft Corp.'s Windows NT Server and SQL Server.

Iterated Systems executives said the image server will help customers with large media assets, such as Ford, speed up the production and distribution of visual images on Web sites.

The automaker will use the MediaBin server to store digital logos and photographic images for its 13 vehicle lines. Ford will make this content accessible to its marketing and Web development departments and to its dealerships via a corporate intranet.

One-Stop Shop

"What we want to do is establish a one-stop shop site for all brand image assets," said Gloria Gomah, a senior graphics specialist at Ford. "It helps our people internally to ... manage their efforts more efficiently and to track down where to get the image," Gomah said. "Right now, it may take two or three calls to find art. We're streamlining the process so that they can go to one site and get what they need."

Asset management software

rivals such as San Francisco-based Canto Software Inc. and Atlanta-based The Software Construction Co. (SCC) offer similar features for storing and resizing original content.

Focused on the publishing sector, SCC's MediaServer stores images as JPEG files but doesn't enable automated conversion to other formats.

Canto's Cumulus media management tool only offers automated format conversion for JPEG files. Canto partners with Iterated Systems to provide a the ability to convert images to other formats.

Prospective Iterated Sys-

tems customer Terri Hanson, staff manager of photography at a major U.S. airline, said MediaBin is distinctive because it converts images to different formats and sizes on the fly.

Multiple Uses

For example, with MediaBin it's possible to store an image in one format in a database then later render it as a lower-resolution thumbnail for a Web site or as higher-resolution photograph for a print catalog.

Companies with extensive media assets need format-neutral ways to manage images, said Tony Henning, an analyst at Future Image Inc., a digital imaging market research firm in San Mateo, Calif.

"Images are not just created for the Web. If a photo is of high quality for a print catalog, MediaBin can format it and make it appropriate for publishing on the Web by serving it up in a different way," Henning said. ▶

Microsoft Offers Free Components via Web

Analyst: Service convenient, but finding right snippets of code may prove difficult

BY LEE COPELAND

Finding components to quickly build an application developed in Visual Basic may now be a bit easier with Microsoft Corp.'s launch last week of a Web-based code service.

Microsoft's Code Librarian Update service offers free code components for functions such as launching routines to open Windows applications from different interfaces.

The service, available via the Web at *www.msdn.microsoft.com* and updated monthly, is for use in the development of Microsoft Office and Visual Basic applications.

The service lets developers search for and download pre-written code samples from Microsoft applications, such as Excel and Word, and from applications from Microsoft's independent software vendors.

Analyst Mark Driver at Gartner Group Inc. in Stamford, Conn., said Microsoft's code offering is on par with the developer portals of rivals IBM and Sun Microsystems Inc.

"A lot of developers learn by studying source code," said Driver. "What works best is to incorporate discrete code elements into a large theme, which is much better than giving the entire application. Why throw a Bible at them when they only need a verse?"

Analyst Rob Enderle at Giga Information Group Inc. in Cambridge, Mass., said developers accustomed to downloading tools from the Web could find the component offering convenient, but added

that finding the right code snippet on the fly presents a challenge.

"The difficulty with small, discrete components is knowing when you need one and how to get to the one you need. You can't spend the first two hours of the day looking for things that may or may not be there," said Enderle.

Enderle suggested that Microsoft look to add other services targeted more specifically to users' needs. Microsoft estimates that its application development tools have more than 2.6 million users.

Visual Basic developer Rodney Bergren, technology coordinator at Des Moines Area Community College in Ankeny, Iowa, has downloaded code components from the Web to build applications but said he doesn't anticipate using the new service.

"We write a lot of in-house applications, and we usually have to pay to download [the code], so we don't do it," said Bergren. "It may be a way to get around delays in gaining access to Visual Studio.

It's frustrating to wait a while longer to get a hold of the technology that I want to play with tomorrow," Bergren added. ▶

Code Libraries

Developer portals:

URL	RESOURCES
www.developer.com	Visual Basic, Java, C/C++, Palm OS
www.freshmeat.net	Unix, Linux, VB software, games
www.flashline.com	Java and COM components

NEWS

Electronic Banks With Targeted Marketing Tops in Survey

BY MARIA TROMBLY

Comerica Inc. in Detroit and American Express Co. in New York scored highest in a survey rating 41 online banking sites on their levels of interactivity.

The study, conducted by Atlanta-based Speer & Associates Inc., also found that banks with both a virtual and physical presence do a better job of serving their customers on the Internet than those that are online only.

Unlike most institutions, Comerica and American Express are conducting targeted online marketing with their customers. Meanwhile, the majority of the other institutions in the survey have Web sites with lower functionality that merely allow users to make inquiries and transactions.

But even Comerica and American Express fell short of the standards set by other industries, which integrate external marketing data with internal customer database knowledge and Web site usage information, according to study author George Albright, chairman of Speer & Associates.

"Without better use of the interactive marketing capabilities enabled by the Internet, financial institutions are missing the principal opportunity presented by the Web," said Albright, in a statement. "As this occurs, sales opportunities will be squandered. But more importantly, customer relationships will be lost to more aggressive firms with highly developed Internet marketing capabilities."

He added that leading Internet firms in other industries improve their Web sites as often as once a month.

"The financial services industry cannot keep pace with customer expectations or exploit marketing opportunities on the Web by maintaining traditional development timetables and marketing information system priorities," Albright said. "Transactional services are not the endgame."

Playing Catch-up

Banking has been slower to move online than other industries and slower than other types of financial institutions, said Mark Macklin, an analyst at Cambridge, Mass.-based Forrester Research Inc.

"They have the old way of banking," he said. "The culture internally remains the same. You still have people making decisions who may get the Net, but they don't necessarily know how to implement the Net."
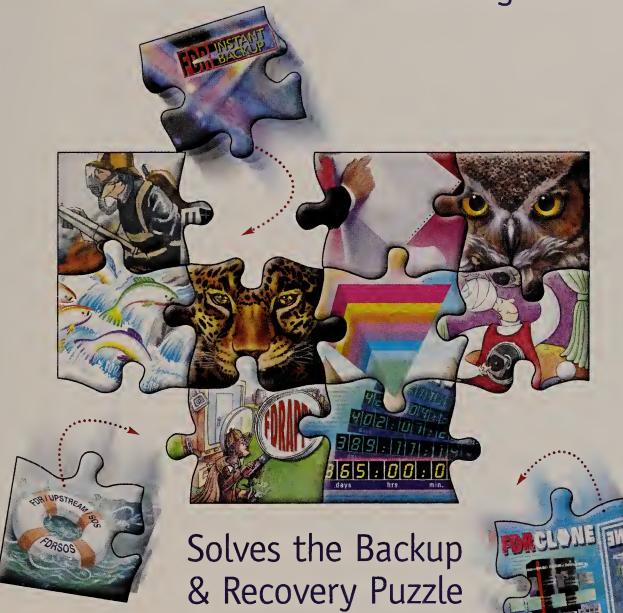
In comparison, he said, San Francisco-based brokerage firm Charles Schwab & Co. updates its Web site at least once per quarter.

American Express prides itself on updating its Web site frequently.

Desiree Fish, a spokeswoman for American Express, noted, "We're constantly improving it." ▶

Survey: Skills Shortage Spurs Outsourcing

BY JULEKHA DASH

Companies that look to outsource may be more interested in procuring the right skills than cutting costs, according to the results of a new survey.

U.K. firm Xephon PLC found that 43 out of 90 companies with at least 7,000 employees decided to outsource because they either didn't have the right skills in-house or they wanted internal staff to work on more strategic projects.

That was certainly the case for the firm that manages Comfort and Quality Inns in 27 states. Chuck Warczak, a vice president at Sunburst Hospitality Corp. in Silver Spring, Md., said the main advantage of selecting USinternetworking Inc. to host and manage PeopleSoft financials was to have a team of dedicated PeopleSoft experts at his disposal.

Prior experience with a PeopleSoft implementation — which took more than two years and cost almost double the original estimates — at Choice Hotels, his former parent company, made Warczak less than optimistic about Sunburst's ability to hire the right people for the job. After Choice Hotels went live with PeopleSoft, a competitor lured away the firm's in-house experts.

"Beyond implementation, I don't think we can provide the kind of challenging environment" to retain PeopleSoft specialists, said Warczak.

In fact, some companies find that outsourcing can help retain existing employees. Many companies select an application service provider to handle more mundane tasks so their internal information technology staff can handle more complex projects, said Meredith Whalen, an analyst at Framingham, Mass.-based International Data Corp.

"You have to provide intangibles like cutting-edge projects [to] retain IT personnel," said Whalen.

In spite of having a dedicated in-house IT staff, even large companies are chasing certain sought-after skills, such as experience with e-commerce projects, said Xephon research director Mark Lillycrop.
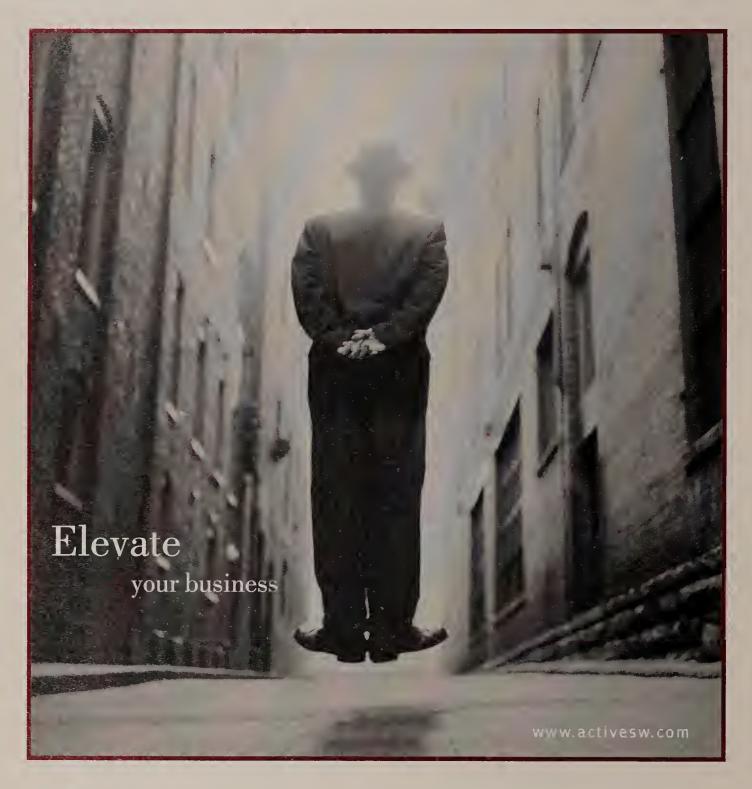
He said the types of e-commerce experience companies cherish most include Web development, Java programming and understanding how to connect the Web to back-end legacy systems. "There's a huge demand for those type of skills [that have] grown up separate from the internal data center world," Lillycrop said.

Selecting an application service provider has some financial benefits as well. Though a firm might spend $1 million in monthly fees over a three-year period to rent software, the money is spent over time rather than doled out in a lump sum to buy equipment, said Whalen. ▶

NEWS

Compaq Starts $1B Fund

Will invest in, loan money to service providers as outsourcing interest grows

BY JAIKUMAR VIJAYAN

THE GROWING corporate interest in renting applications and infrastructure services over the Internet is driving the development of closer relationships between hardware vendors and service providers.
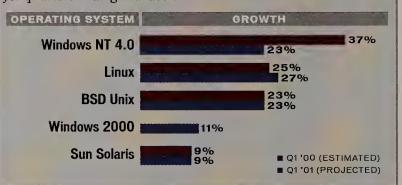
Last week, Compaq Computer Corp. became the latest vendor to announce a wide-range financial program targeted at companies that sell rented applications, systems management services, hardware storage and network bandwidth over the Internet.

Under the program, Compaq will commit more than $1 billion to the service provider market this year. Of that amount, $600 million will be loaned to start-ups and established companies for equipment, storage, software and related purchases. About $400 million is being earmarked for equity investments and partnerships with service providers.

Vendor Investments

Top platform revenue growth in the service provider market for quarters ending March 31:

OPERATING SYSTEM	GROWTH	
Windows NT 4.0	23%	37%
Linux	25%	27%
BSD Unix	23%	23%
Windows 2000	11%	
Sun Solaris	9%	9%

■ Q1 '00 (ESTIMATED)
■ Q1 '01 (PROJECTED)

SOURCE: ABERDEEN GROUP INC., MARCH 2000

Compaq's move comes as interest in outsourcing key information technology functions and technologies to service providers is on an upswing.

For instance, more than one-third of IT and development managers at large corporations expect to rent applications from application service providers this year, according to a survey conducted last December by Evans Marketing Services in Santa Cruz, Calif.

The strongest support for renting came from the professional services sector, which includes the insurance, legal services and real estate markets, according to the survey.

"The fact of the matter is that service providers are hot," said Joyce Tompsett-Becknell, an analyst at Aberdeen Group

Inc., a consultancy in Boston. "As their infrastructure demands grow, they are going to need more servers" than are found at even some of the biggest corporate customers, she added.

Broader Market

Compaq is hardly alone in its efforts to team up with Internet companies. Rivals such as Sun Microsystems Inc., IBM and Hewlett-Packard Co. all offer similar programs for dot-com start-ups and Internet hosting companies.

But Compaq's offering is broader in the sense that it targets not only application service providers and Internet providers but also network and infrastructure providers, said Thomas Kucharvy, president of Summit Strategies Inc., a Boston-based consultancy.

"Equity investments have become absolutely de rigueur" for vendors selling in the service provider space, Kucharvy said.

Conversely, having an equity partnership with an established vendor gives Internet companies that haven't had initial public offerings added credibility, Kucharvy noted.

"Secondly, they want the vendor they are buying from to have some skin in the game — to really have something tied to their ultimate gain," Kucharvy added. ▶

CompUSA Shuts Cozone.com

Moves e-commerce to eponymous site

BY DEWAYNE LEHMAN

CompUSA Inc.'s decision last week to abandon its e-commerce-specific Web site supports the argument that businesses need to merge their online and brick-and-mortar entities, analysts said.

The Dallas-based computer retailer closed the Cozone.com site it established in October and moved the online sales operations to its primary Web site at www.compusa.com.

The company said the change was part of its new e-commerce strategy to integrate online and in-store sales and services. However, a company spokeswoman acknowledged that CompUSA shut down Cozone.com because the separate e-commerce site had poor sales during the holiday shopping season and never caught on with consumers.

"We just felt it was better to build on [CompUSA's brand name] instead of trying to develop a separate site," said spokeswoman Suzanne Shelton.

The move came as no surprise to some observers familiar with online sales.

"I was a little surprised they even launched Cozone," said

Julian Chu, a retail consultant at Mainspring Communications Inc. in Cambridge, Mass. "By that time, we were already saying you should go to a click-and-mortar strategy," rather than spin off a separate site for e-commerce.

For business-to-consumer operations, "it's starting to look like, in most cases, it's better to stick with your brand name and make the e-commerce part of it," said Keith Waryas, an analyst at Framingham, Mass.-based International Data Corp. "You're going to have to integrate the online with the brick-and-mortar, because the customer sees it as one business."

CompUSA last week also announced the retirement of CEO James Halpin. He will be replaced by Chief Operating Officer Harold Compton. ▶

Handhelds, Wireless LANs Raise Security Flag

BY ANN HARRISON
AND MATTHEW HAMBLEN
NEW ORLEANS

Companies were warned last week that corporate information on handhelds could fall into the wrong hands, but wireless LANs remain a bigger concern.

At a conference here on mobile and remote network access sponsored by Stamford, Conn.-based Gartner Group Inc., analysts scrutinized security issues that handheld users should consider.

The greatest risks surrounding handhelds are that they can be easily lost or stolen. But Gartner analyst Phil Redman said that the wireless devices' best defense is that they are nomadic and not constantly connected to the corporate

network. This fact makes it difficult for interlopers working in the area to locate a specific signal and sort individual messages from the stream on a spectrum band.

Alex Robinson at Maple Valley, Wash.-based Tranzoa Co., producer of the OnlyMe access control program for Palm Inc.'s Palm devices, said that encrypting data with a pass phrase of a half-dozen words makes the data secure, although it's cumbersome to input it on a handheld unit.

Account and password management programs, such as Clifton, N.J.-based Zetetic Enterprises' Secure Tool for Recalling Important Passwords, use 128-bit Triple Data Encryption Standard to store data such as credit-card numbers,

or voice mail access codes. But Robinson noted that encryption programs often require long passwords, and many wireless applications limit the amount of time a user can spend entering this data — ironically, to thwart crackers who may be fishing for passwords.

Password Difficulties

Another drawback to encrypted data is that users can lose data forever by forgetting a password. Encrypted programs generally expand the data, he said, but the old version of the Palm desktop truncated memos to 4KB. "Encrypted memos were longer than 4K," said Robinson. "Now I have several permanently encrypted memos."

Password Tips

- Use both uppercase and lowercase letters
- Include punctuation
- Have third person assign passwords to avoid obvious references to the user

According to Gartner analyst Bob Egan, the security worry is higher when companies use wireless LANs. In theory, a well-equipped corporate spy could position himself near corporate headquarters and tap the stream of wireless data.

While stories about research laboratories conducting strip searches for personal digital assistants or barring scientists from using such devices circulated at the conference, users were encouraged to consider practical defensive techniques. ▶

Cruise Lines Launch Internet-At-Sea Access

Internet cafés boost revenue, help meet land-based resort competition

BY BOB BREWIN

THE CRUISE industry has started a mad scramble to connect its ships to the Internet to compete with resort hotels that already wire their land-based guests.

Most U.S.-based ships, which boarded 4 million passengers from Florida alone last year, are expected to provide satellite connectivity to the Internet by the end of the year. That's just 17 months since Norwegian Cruise Line Ltd.'s (NCL) *Norwegian Sky* set sail with the first seaborne Internet café last August.

The companies have discovered that Internet access has become a competitive necessity, not only in a marketing battle with other cruise lines, but also with high-end resort hotels, where the available service to check e-mail is a given.

Rippling Impact

"The demand for Web access at sea shows the influence of the Internet on our lives," said Perry Sandberg, director of new build solutions at Royal Caribbean Lines Ltd. in Miami. Sandberg, who spearheads Royal Caribbean's Internet-at-sea efforts, said the company has Internet cafés on 11 ships and has started deploying the Net on five more and will install cafés on another five ships by the end of the year.

Jim Lazazzera, vice president of information services at Premier Cruise Lines in Port Canaveral, Fla., said, "We market to kids. They want to use computers. In fact, the kids research the cruises over the Internet." Premier plans to complete Internet café installations on its Big Red Boat fleet of four ships well before year's end.

Cruise passengers "don't want to be too far from what's going on in the world," according to Armando Martinez, director of onboard revenue at Miami-based NCL, which plans to outfit its nine-ship fleet for online access before next year. He said the ability to access stock market prices via the Web ranked just behind e-mail as the most-used services on NCL ships.

Unlimited Revenue Potential

Martinez said Internet access affects revenue, with NCL charging up to $45 per hour.

Glenn Farrington, CEO of Digital Seas International Inc. in New York, said the revenue streams from Internet-at-sea access don't end with the connection charges. "We use flat-panel monitors from Denmark, and if someone likes it, they can buy it. ... The e-commerce possibilities are unlimited."

Digital Seas designed and installed the Internet cafés for both NCL and Premier, and also has contracts with Seattle-based Holland-America Lines, Miami-based Carnival Cruise Lines Inc. and Fort Lauderdale, Fla.-based Renaissance Cruises Inc.

INTERNET ACCESS ON CRUISE SHIPS, such as that offered in Norwegian Cruise Line's Sky Internet Café (above), is said to have boundless revenue potential and e-commerce possibilities

The cruise lines' Internet links don't incur much in additional costs, because they already use broadband satellite services to manage inventories, run credit cards and tie shipboard office and engineering systems to shore-based offices, according to Brad Wiggins, president of Maritime Telecommunications Network Inc. in Miami. Maritime provides satellite services for Digital Seas and its customers.

The Internet-at-sea battle won't end with just public-access cafés. All the major cruise lines are installing ship-wide fiber-optic networks on their new builds to provide in-room access. But don't expect any bargains, because the cruise lines have said they intend to charge the same high rates for in-room access as café access. ▶

Open Market Expands E-Commerce Software Suite

Integrated engine to help companies manage Web sites

BY CAROL SLIWA

Open Market Inc. today will announce an expanded e-commerce application suite to beef up business managers' control over catalog creation and management and help them personalize online marketing efforts.

The Burlington, Mass.-based software maker, one of the first vendors of e-commerce transaction engines, will offer an integrated application suite that includes new releases of two core products: Content Server 3 (formerly Internet Publishing System) and Transact 5 (for processing orders).

"The fact that the transaction and content engines are integrated out of the box is important," said Mitch Kramer, an analyst at Boston-based Patricia Seybold Group. "It's become a requirement in serious e-commerce sites. It speeds implementation time."

Open Market's suite will also feature four new product modules: Marketing Studio, Catalog Centre, Personalization Centre and Syndication Centre.

"It used to be enough to aggregate content and put it in a catalog and display it," said Randy Covill, an analyst at AMR Research Inc. in Boston. "The bar has been raised now. People are looking for ways to display the same content differently to different audiences."

Covill said integrated suites of products can help free companies of the technology burden so they can concentrate on their business models.

Open Market's Content Server, which will support BEA Systems Inc.'s WebLogic and Sun/Netscape Alliance's iPlanet application servers, will be available by month's end at a starting price of $50,000. Transact, which features a more flexible shopping cart and new and enhanced application programming interfaces, is also expected by month's end. Pricing starts at $125,000.

Additional modules will roll out through June. ▶

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BRIEFS

Novell Clusters 32

Novell Inc. last week shipped an update to NetWare Cluster Services, adding support for NetWare 5.1 and for 32 nodes. The update costs $4,999 per node. More than 80 vendors will demonstrate directory-enabled applications at Brainshare in Salt Lake City this week.

Seagate Storage Boost

Technologists at Seagate Technology Inc. in Scotts Valley, Calif., announced that they now can store 45 billion bits of data in a square inch of space on a storage device, the highest amount so far. Seagate and IBM are racing to increase storage density, but Seagate boasted that its latest innovation doubles its previous density record and is the third world record it has hit in a year.

Data Sticks to Tape

Scientists from the European Media Laboratory (EML) in Heidelberg, Germany, recently demonstrated that 10GB of data can be stored on a roll of adhesive tape of Hamburg, Germany-based Beiersdorf AG's Tesa Multi-Film. EML worked with the Institute of Computer Science at the University of Mannheim in Germany.

Twinkie Crisis Online

Until a Teamsters strike ended last week, Internet auction site eBay Inc. had 158 entries for people offering to sell Twinkies, which weren't being delivered due to the strike. A few saw offers in the range of $1 or $2 per box, and one offering received 11 bids, with the top price going as high as $5,150.

Short Takes

The WHITE HOUSE's $50 million Y2k monitoring center will close for good March 31. . . . SAP AG has announced it's forming SAPMarkets, a new subsidiary dedicated to its mySAP.com applications. . . . GARTNER GROUP INC. in Stamford, Conn., paid $80 million to acquire TECHREPUBLIC INC. in Louisville, Ky., an online community for information technology professionals. . . . PITNEY BOWES INC. in Stamford, Conn., has named Gregory Buoncontri to its top IT position.

Internet Tax

at the center of the debate over Internet taxation last week. Unlike pure dot-com companies, Abercrombie's 250 stores give the company a national physical presence, meaning the retailer must charge its online customers sales taxes in most states. Dittmar's job includes managing the tax software.

"If they removed our need to collect taxes, that would just save us money because we would stop renewing our [tax software] maintenance and licensing agreements. But it wouldn't be like we would have to lay someone off," Dittmar said. Collecting taxes isn't very complex, he added.

The real problem concerns competition. Big retailers such as Wal-Mart Stores Inc. in Bentonville, Ark., urged the Advisory Commission on Electronic Commerce to adopt a proposal that "leveled the playing field" by imposing an equal obligation on all Internet sellers to collect taxes.

The commission came close to reaching agreements but fell two votes short of the required two-thirds — or 13 of 19 votes — for any of its proposals to become recommendations to Congress.

"I don't believe what separates us are special interests," said AT&T Corp. Chairman Michael Armstrong. "I think what we have really run into is the issue of time."

Time is short for the commission, which began meeting in June of last year. A final report to Congress is due next month.

The Debate Continues

More companies could begin to follow Wal-Mart's example and turn their online businesses into separate subsidiaries. By doing so, Wal-Mart is able to avoid collecting sales taxes from its online customers, except those who live in California, Utah or Arkansas.

"We're going to compete on the Internet," said David Bullington, a Wal-Mart vice president.

Retailer J. C. Penney Co. is considering a similar move.

"Anybody in our business has to think about that," said Wayne Zakrzewski, a tax manager at the Plano, Texas-based retailer.

But the tax implications are muddy. Wal-Mart, for instance, lets online customers return merchandise to local stores, a practice that many experts say increases a company's tax obligation.

The six business members on the commission sought uniform nexus or physical presence rules to settle these issues. But

ARMSTRONG: Time is the big issue for the commission

disagreement among the businesses and commissioners from state governments over nexus crippled the talks.

Key to any Internet tax collection plan is the simplification of tax laws. A number of states intend to push for that while also investigating technological solutions. One product, a transaction server developed by Taxware International Inc. in Salem, Mass., uses Internet protocols to manage taxes and potentially link to state tax systems.

Jennifer von Drechsel, an automated-compliance tax expert at PricewaterhouseCoopers in New York, said she believes companies will move to tax transaction servers to simplify processes. But she said she also sees greater interaction between corporate tax and information technology departments, as enterprise resource planning systems automate tax functions.

A key problem is getting tax and IT professionals to understand one another. "They are almost talking different languages," von Drechsel said. ▶

IBM/Linux

commercial customers later this year.

IBM's Global Services division has already rolled out Linux clusters at several unnamed commercial customers' sites, said Turek. The systems will contain clustering technology ported from the RS/6000 SP platform and will run a range of applications. Those will include databases, data warehouses and electronic-business applications.

During the past two years, IBM has made a series of Linux-related announcements, including supporting Linux on all its servers and porting virtually all its applications and middleware to the operating system.

Several vendors, including TurboLinux Inc. in San Francisco, are already offering clustering software for Linux, and Silicon Graphics Inc. in Mountain View, Calif., recently announced a cluster offering that is mainly aimed at technical markets.

Some analysts said they wondered where IBM's increasing focus on Linux would leave Project Monterey, the joint attempt by IBM and The Santa Cruz Operation Inc. (SCO) in Santa Cruz, Calif., to develop a common Unix version for Intel Corp.'s upcoming 64-bit processors, called Monterey/64.

"I've seen signs that Monterey is not necessarily a long-term initiative for IBM," said Stacey Quandt, an analyst at

Giga Information Group Inc. in Cambridge, Mass.

IBM's Miles Barel, program director for Unix marketing, disputes that. But Monterey will be able to run many Linux binaries, and Monterey applications will be easily moved to Linux. To make this migration easier, Turek said, IBM will port some features that are part of the AIX kernel and offer them as layered products on top of Linux.

"If Linux becomes the platform you want to be on five years from now, moving there from Monterey is going to be very, very easy," said Barel.

Strategy May Backfire

Barel said he hopes that this strategy will give Monterey an edge over Solaris because of Sun Microsystems Inc.'s more reserved position toward Linux. But it could backfire.

"Sun and HP will pounce on any whiff that IBM might be abandoning AIX," said Tony Iams, an analyst at D. H. Brown Associates Inc. in Port Chester, N.Y.

One RS/6000 user said he saw no contradiction in IBM's simultaneous support of AIX/Monterey and Linux. "It encourages me," said Jay Chavez, vice president of worldwide Internet services at Ursus Telecom Corp. in Sunrise, Fla. "It means that they're not trying to lock me into one platform."

But if IBM continues to proselytize about Linux, "then I would be led to believe that users should be very careful about adopting Monterey," said George Weiss, vice president and research director at

IBM's Netfinity Linux Cluster

"Los Lobos" Linux cluster IBM delivered to the University of New Mexico is built from 256 Netfinity servers with two 733-MHz processors connected by a switch from Myricom Inc. According to IBM, it will:

- Perform 375B calculations per second
- Cost just over $1.5M
- Be the 24th most powerful supercomputer in the world
- Be the precursor to commercial Linux clusters from IBM

Gartner Group Inc. in Stamford, Conn.

Iams said IBM's support will be key to Linux. "If Linux is going to move into the big time, it's going to be with guys like IBM," he said. "It takes profound commitments and big bucks from major players."

However, Bob Venable, manager of enterprise systems at Blue Cross/Blue Shield of Tennessee in Chattanooga, said he doesn't believe that Linux will soon be able to support large systems like his Oracle database, which runs on a 12-processor RS/6000 System 80. But an IBM Linux offering, coupled with IBM services, could still be an attractive platform, he said. ▶

MOREONLINE

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It's that sinking feeling in your stomach. That look your face makes every time you read a story about a disastrous corporate security breach. It's that nagging fear that won't go away no matter how many times you tell yourself there's nothing to worry about. Because there is, security is the number one concern of every IT professional for good reason. The good news is that there's a proven solution you can trust.

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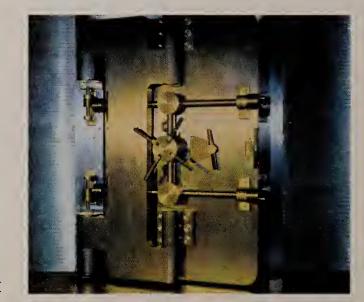
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Online business through eCommerce, corporate intranets, partner-to-partner transactions

on extranets and websites, as well as their supporting enterprise-wide assets — all need to be secured. Protecting the integrity and availability of intranet information is critical to all organizations.

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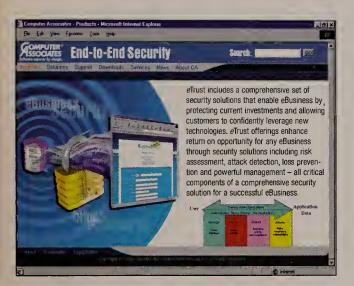
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Companies Aren't Rushing to Conduct Business Online

Study: Only 40% of large businesses are able to receive orders online

BY JULIA KING

FOR ALL THE HYPE surrounding e-commerce and digital marketplaces, a new study indicates that corporate industrial giants are lumbering, rather than sprinting, their way to the brave new world of Internet business.

While most have corporate Web sites listing their products and services, only 40% of large companies can receive orders online. And even fewer — 28%

of companies — can accept electronic payments.

Perhaps most noteworthy is that one out of four companies have yet to take any significant action on the electronic-business front, even though they consider it important, according to a survey of senior executives at 78 industrial companies conducted by PricewaterhouseCoopers in New York.

"These are big companies that have a lot at stake with their brands, relationships

with supply chain partners and customer reactions. They are being cautious about how they deal with this," said Ed Berryman, author of the PricewaterhouseCoopers study.

"Many of them are looking for examples of firms that are more like they are, rather than just dot-coms," Berryman said.

At the same time, Berryman said, companies are making preparations internally for an eventual huge leap into e-commerce and, potentially, an even bigger game of catch-up.

For example, 79% of respondents said e-commerce provides less than 5% of revenue. But they said they expect that

figure to jump to more than 20% by 2003.

Another key indicator of companies' great electronic-business expectations is the widespread creation of full-time e-commerce teams, which are replacing part-time task forces and information technology project teams at many industrial companies.

Milwaukee-based Brady Corp., which makes industrial labels and signs, is a prime example. Since last August, the company has appointed four full-time electronic-business directors, implemented an Internet-based extranet ordering system for its U.S. distributors

and set a corporate goal of doing 50% of all business online by 2003 — a big increase over the current figure of about 7%, said Steve Hasbrook, corporate e-commerce director.

"We pulled e-business out of IT, and now, all e-business resources report to vice presidents of the business groups," Hasbrook said. "We see it as a very strategic business initiative. Things are moving very fast," he added. ▶

Brainshare: Novell Faces Up To Windows 2000 and Linux

Active Directory coexistence is key

BY DOMINIQUE DECKMYN

The NetWare faithful will gather in Salt Lake City this week for a critical Brainshare user conference. Novell Inc. needs to prove its core Novell Directory Services (NDS) technology can coexist with Microsoft Corp.'s Active Directory and that Novell can offer services on top of NDS that guarantee future growth.

In February, the company formulated this growth strategy by repositioning itself as a provider of "Net Services" — platform-independent, directory-enabled offerings for Internet, intranet and extranet environments.

It also announced iChain, a Net Service that will use NDS as a platform for electronic business, and two new systems management tools, ZENworks for Networks and ZENworks for Servers. Also, the company shipped versions of its NDS eDirectory, the latest release of NDS, that run on Windows 2000 and Linux.
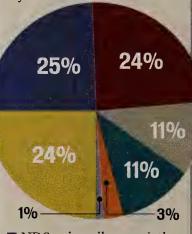
Rocco Esposito, information technology director at window-shade maker Hunter Douglas Inc. in Broomfield, Colo., said NDS is what makes him stick with Novell. "I want to have a single directory with single sign-on," said Esposito. "I'd like to see everything directory-enabled." But while Esposito prefers NDS, he said he fears that "if third-party developers start to develop to Active Directory natively, Novell has trouble."

A *Computerworld* survey indicates that Active Directory will coexist with NDS in the majority of NetWare sites. Neil MacDonald, vice president and research director at Gartner Group Inc. in Stamford, Conn., said NDS users will have little choice, since applications like Exchange 2000 will require Active Directory.

"They need to demonstrate that they are going to coexist with Active Directory," said Lee Roth, LAN and security services manager at Southwest Airlines Co. in Dallas. Southwest is building a security infrastructure on top of NDS and intends to use NDS as the focal point for a range of new appli-

cations. But like most NetWare sites, Southwest is using Windows NT for application servers and is looking at Windows 2000. ▶

Doomed to Coexist
Which one of the following best describes your organization's strategy for directory software?

- 25% / 24% / 11% / 11% / 24% / 1% / 3%

- NDS primarily, coexisting with Active Directory
- NDS and Active Directory coexisting equally
- Don't know
- Moving from NDS to Active Directory or replacing NDS with Active Directory
- Active Directory primarily, coexisting with NDS
- Active Directory only
- NDS only

*Note: Percentages equal 99% due to rounding. Base 79 companies

SOURCE: COMPUTERWORLD RESEARCH, MARCH 2000

E-Customers Not Satisfied

BY DeWAYNE LEHMAN

Businesses on the Web will have to increase their commitment to online service to overcome the high dissatisfaction among customers who contact them electronically, according to analysts.

A survey of 10,000 Internet customers found that only 36% are satisfied with their online interactions and that more than half of the transactions require a phone call or other offline interaction to resolve.

The study, conducted by e-Satisfy.com in Arlington, Va., for the International Customer Service Association in Chicago, also showed that online customers generally have higher service expectations.

For example, the online shoppers surveyed said they expect acknowledgement of any contact they make within an hour, but only 42% said they get it within 24 hours. And nearly 40% of the respondents said they never get a final response to attempts to contact a company via the Internet.

The survey's findings are in sharp contrast to previous studies that indicated that Web businesses generally have met

online shoppers' expectations.

The contrast is attributable to the different approaches taken by dot-com companies and traditional businesses that go to the Web, said Laurie Windham, CEO of Cognitative Inc., a consulting firm in San Francisco.

"Up to now, the Red Sea has parted between the dot-coms and the traditional brick-and-mortar businesses. I'm not sure if Ford, [Hewlett-Packard] or American Express are getting it yet," she said.

The survey questioned customers of 16 businesses about the electronic interactions that they conducted.

The businesses with Web sites studied in the survey included American Express Co., Ford Motor Credit Co., Hewlett-Packard Co., Procter & Gamble Co., Nextel Communications and Southern California Edison.

Need More Than a Pretty Site

The study's findings reveal a serious weakness for many businesses on the Web, said Conrad Hanf, an analyst at Dedham, Mass.-based ARC Advisory Group Inc. Companies need "more than just a pretty Web site and e-mail address URLs," he said.

"People who use this technology expect it to work, and if it doesn't, it's frustrating," Hanf said. ▶

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CA Unveils Management Framework Beta

But integration of tools has been slow

BY SAMI LAIS

Computer Associates International Inc. last week released the beta version of its new enterprise management framework, Unicenter TND.

Industry analysts lauded the possibilities TND offers for managing not just a company's information technology infrastructure but also its entire business environment.

But they also noted that although CA was trumpeting TND's visualization capabilities, predictive capabilities and business-oriented views of network data, the company was quiet regarding the state of integration of data repository tools that CA gained when it acquired Platinum Technology Inc. last June.

That integration is progressing more slowly than had been hoped, said Michael Dortch, an analyst at Robert Frances Group Inc. in San Francisco. But to raise minor objections about it is to miss the real value TND could offer, he said.
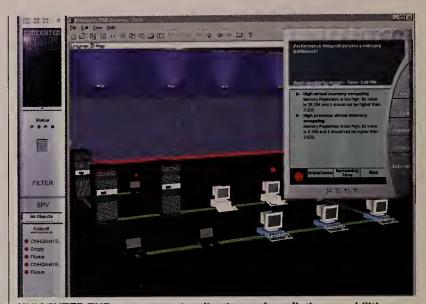
"If I'm a network or systems manager, and TND gives me the ability to scroll forward and backward in time to view my infrastructure and predict problems, that's an obvious immediate benefit," Dortch said. "But think if you could apply those same predictive facilities to a sales prospects database."

CA's long and intense support of visualization comes into its own with TND, said Steve

Foote, a former database administrator who is now an analyst at Enswers.com Inc. in Boston.

Foote referred to a site with 10 million systems and network management data points. "How do you deploy threshold definitions for events on that many data points? You can't," at least not manually, he said.

The ability of TND and CA's Neugents neural network technology to automatically deploy and, over time, refine those definitions is "impressive," Foote said. "It's been hard enough to do anything like this in a distributed shop but virtually impossible in an e-business shop," he said.

One reason for the difficulty, he said, is that "e-business application performance is so subjective. What constitutes a good response time at one time for one application may not be good in the context of what your competitor is doing." ▶

UNICENTER TND possesses visualization and predictive capabilities

Airlines' IT Mishaps Slow Operations, Anger Customers

Cable cuts affect backup system, too

BY DEWAYNE LEHMAN

A SEVERED cluster of cables last week left thousands of airline passengers nationwide stranded and Northwest Airlines Inc. officials wondering why their backup system was also disabled.

The problem began when a subcontractor laying new lines in Eagan, Minn., bored through clusters of cables, cutting 244 fiber-optic and copper telecommunications lines. The lines included those that link Northwest's Minneapolis-St. Paul hub to the rest of the nation.

What Northwest officials soon discovered was that their redundant system lines apparently run alongside the lines they are backing up.

"What we don't understand is why the redundant system was also affected," said Kathy Peach, a spokeswoman for Northwest. "It does seem odd that the redundancy is so near the main lines. Because the cut was so severe, it also affected the redundant lines."

A spokesman for Denver-based US West Inc., the local phone provider whose lines were cut, didn't return phone calls immediately.

But a worker who didn't want to be named blamed the problem on the "reckless abandon" of the subcontractor who was laying new cables for a US West competitor when the lines were cut. ▶

Subscribers' e-mail addresses released

BY LINDA ROSENCRANCE

T RANS WORLD Airlines Inc. spent last week trying to appease angry subscribers to its electronic newsletter after their e-mail addresses were inadvertently leaked to other subscribers.

Mark Abels, a spokesman for the St. Louis-based airline, said a glitch on March 20 involving new list-management software exposed the addresses of about 80% of the people who subscribe to TWA's e-mail service, Dot Com Deals. Dot Com Deals provides subscribers with information about last-minute fares.

Abels stressed that no financial or other personal information about customers was ever released. However, Dot Com Deals' subscribers could be deluged with unsolicited bulk e-mail, also known as spam.

"It was actually a human error, but we've fixed it," Abels said. "The software should have gone through more quality control [before it was used]."

While the problems created in this case were relatively minor, privacy advocates say companies must do more to protect an individual's information.

"Privacy really has to be of greater concern, and individuals have to have more system training," said Ari Schwartz, a policy analyst at The Center for Democracy and Technology, a privacy advocacy group in Washington. ▶

Next-Generation Browser Technology Wins Supporters

BY DOMINIQUE DECKMYN

After more than two years, Netscape Communications Corp.'s experiment with open-source development is finally inching toward fruition.

Last week, the America Online Inc. subsidiary said it would launch a beta version of its Netscape 6 browser within 25 days.

Seven vendors, — IBM, Intel Corp., Red Hat Inc., Sun Microsystems Inc., NetObjects Inc., Liberate Technologies and Nokia Corp. — announced support for Gecko, the open-source browser engine at the heart of Netscape 6.

Gecko was developed with input from Mozilla.org, the open-source organization founded

by Netscape two years ago.

Netscape 6 will be the first Netscape browser to be based on code from Mozilla.org and the first to include Gecko. It will be the successor to the current Navigator 4.7.

Originally, Netscape had planned an interim version of its browser, to be called Navigator 5. "But we got clear feedback from developers that they didn't want an incremental upgrade; they wanted a clean rewrite," said Eric Krock, senior product manager at Netscape.

"If Gecko delivers what it promises — and if other browser

makers follow Netscape's lead — it will enable us to write to standards instead of authoring to the deficiencies and quirks of various browsers," said Jeffrey Zeldman, a New York-based Web designer and group leader of the Web Standards Project, an advocacy group.

AOL uses Microsoft Corp.'s competing Internet Explorer browser for its online service. But AOL intends to use Gecko as a component in future versions of its Instant Messenger and ICQ products, and in its AOLTV set-top box, Netscape officials said. ▶

Netscape Is Back

A new Netscape browser is nearing the market. The Gecko engine:

■ Is a small, open-source, embeddable browser engine

■ Supports HTML 4.0, XML, cascading style sheets and Document Object Model

■ Supports XUL, an open-source XML technology for creating customizable GUIs across multiple desktop platforms and devices

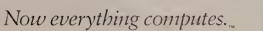■ Doesn't contain a Java virtual machine, but different JVMs can be plugged in

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Chris Dressler, Senior Program Manager, NORDSTROMshoes.com

"So the challenge here was knowing the speed of how quickly we had to bring shoe vendors online."

"We went from 6 to 10 to 20 vendors and we're continuing down that road."

"So how do we rapidly do the development to make all this happen?"

Survey: Cybercrime Cost Firms $266M in '99

BY ANN HARRISON

Cyberattacks cost U.S. companies $266 million last year — more than double the average annual losses for the previous three years, according to a newly published report.

The study, released by the San Francisco-based Computer Security Institute (CSI) and the San Francisco FBI Computer Intrusion Squad, found that 90% of 273 respondents detected some form of security breach in the past year.

Dan Erwin, who conducts information security strategy and planning at The Dow Chemical Co. in Midland, Mich., said he believes that the higher loss figures are a combination of more security intrusions and better reporting. "If an information site is down, how do you quantify loss?" said Erwin. "But if you have a site you are doing sales on and it goes down, then you are losing sales. That's an easier number to quantify and obviously more important."

Based on information from 273 of CSI's members, 70% reported serious security attacks, including theft of proprietary information, financial fraud, systems penetration from outsiders, denial-of-service attacks and sabotage of data or networks. This figure, up from 62% the year before, didn't include data from the most common security problems — those caused by computer viruses, laptop theft and unauthorized Internet access.
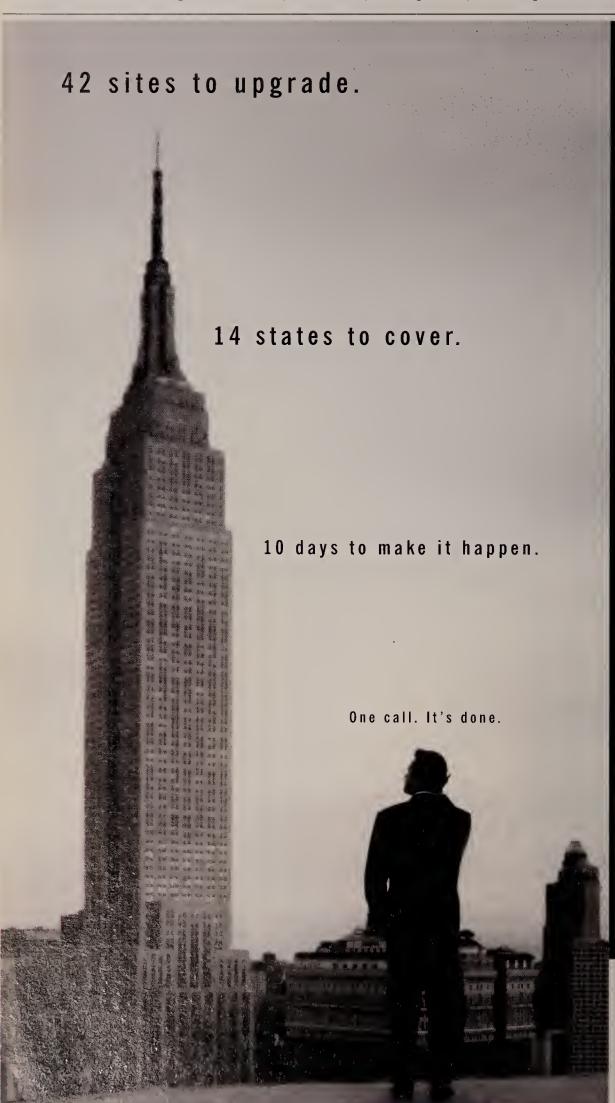
Costly Problems

Topping the list of costly security breaches was $66.7 million in losses from theft of proprietary information reported by 66 respondents and $56 million in losses from financial fraud cited by 53 organizations. Sixty-one respondents said they suffered $27 million in damages from sabotage of data or networks, compared with a total of $10.8 million for previous years.

Richard Power, CSI editorial director, said other intrusions, such as the denial-of-service attacks that hit top Web sites earlier this year, were on the increase last year. And because so many firms are conducting e-commerce, these attacks contributed to higher losses. "In 1999, we had 28 incidents of denials of service with a total of $3.25 million in losses, and in 2000 so far we have 46 incidents for a total of $8.2 million dollars," said Power.
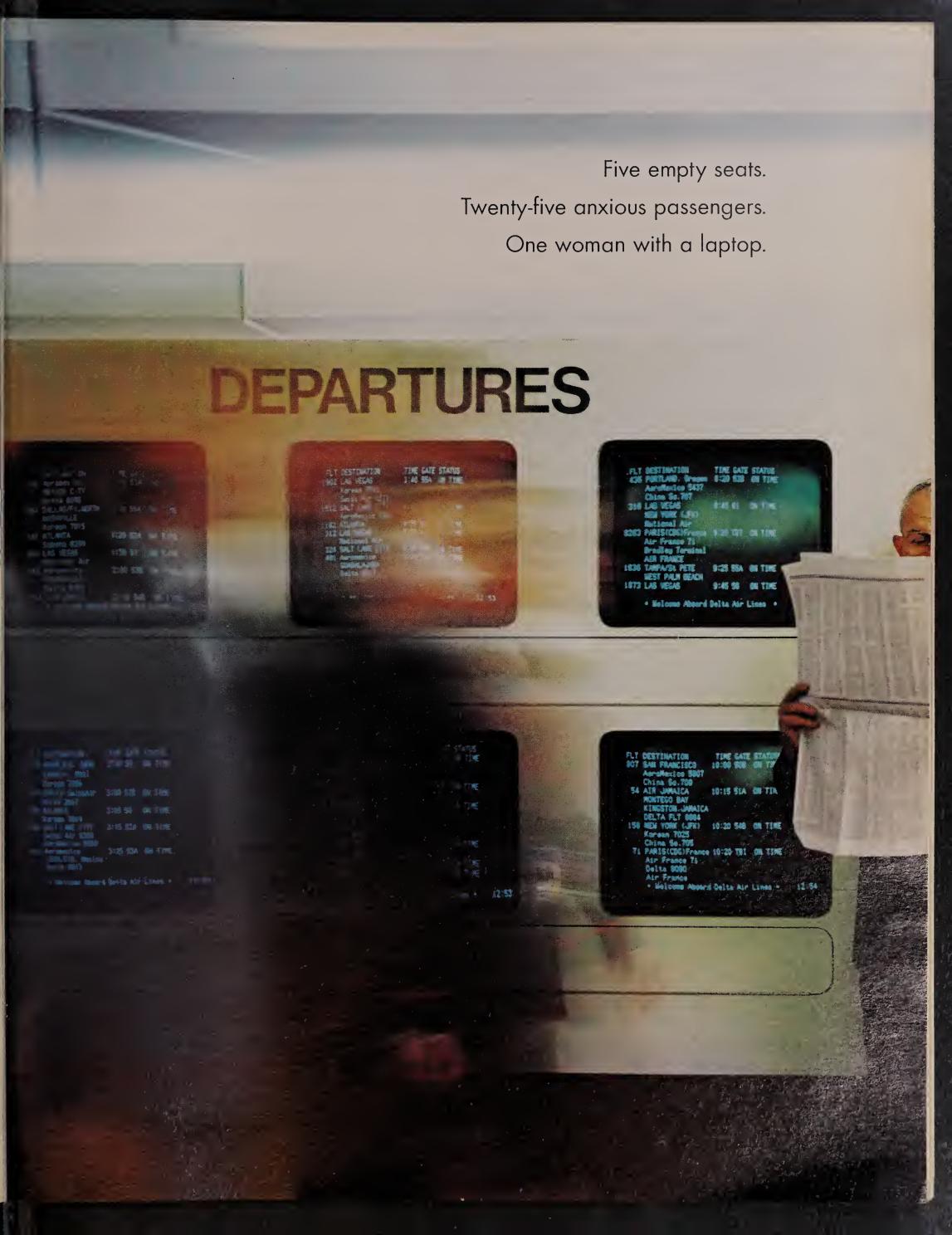
According to the report, 74% of the respondents confirmed that they sustained financial losses due to security attacks, but only 42% were willing and able to quantify these costs.

CSI Director Patrice Rapalus said the report indicated that unauthorized access and security attacks are widespread. She said government and private-sector organizations must increase their focus on sound security practices, deployment of defensive technology, and training and staffing of security managers. ▶

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DEPARTURES

EPARTURES

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SCO Reorganizes, Expects Low Sales

Company blames Y2k-related delays; competition from Linux takes its toll

BY DOMINIQUE DECKMYN

ANALYSTS have applauded the decision by The Santa Cruz Operation Inc. (SCO) last week to divide itself up into three divisions. They said the move will help the company's Tarantella middleware product and the company's attempts to break into Linux services.

But some voiced doubts about the long-term viability of SCO's UnixWare operating system.

The Santa Cruz, Calif.-based company warned investors that sales will be below analysts' estimates for its second quarter, which ends March 31. SCO will be restructured into the following divisions: Server, Tarantella and Professional Services. It expects to report "significant losses" after reorganization costs.

In a statement, Doug Michels, SCO's president and CEO, blamed Y2k-related delays "and other effects" for the shortfall. But analysts said SCO's operating systems are under fire from Linux.

"Linux can give you the same value proposition [as SCO] — a Unix on cheap hardware — for less money," said Tony Iams, an analyst at D. H. Brown Associates Inc. in Port Chester, N.Y.

At the same time, said Iams, SCO's attempts to compete at the high end with Hewlett-Packard Co. and Sun Microsystems Inc. haven't been entirely successful.

Benefits

Iams said the reorganization de-emphasizes the UnixWare operating system and will benefit other products, especially Tarantella.

Tarantella is a middleware product that allows browser-based clients to access applications that run on Unix servers, Windows NT servers and mainframes. It competes with MetaFrame, from Citrix Systems Inc. in Fort Lauderdale, Fla. The new corporate structure will allow the product to be marketed and sold more effectively, said Mike Orr, who will serve as president of the Tarantella division.

Chris Clabaugh, CEO of Allegrix Inc., a Santa Clara, Calif.-based application service provider and Tarantella user, said he believes that the reorganization will benefit Tarantella. "It helps remove the impression that Tarantella is SCO Unix only," said Clabaugh.

Company Plans

The new structure will also make it easier for each division to pursue the Linux market, said Orr. The company has already announced significant steps there, including professional services and a version of Tarantella for Linux.

Orr said the company now intends to take portions of its UnixWare operating system and market them as layered products on top of other Unix versions and Linux.

"That way, we get a bigger market for each product individually," said Orr. Programming interfaces for SCO UnixWare and Linux will be "virtually identical," he said, and "increasingly, we will not care which one you use."

Orr didn't say how these changes will affect Project Monterey, the company's joint effort with IBM to develop a 64-bit Unix system for Intel Corp.'s IA-64 architecture.

SCO said it expects results for its fiscal year to be "significantly lower" than the original estimates of $250 million in revenue and earnings of 60 cents per share. ▶

> ## Linux can give you the same value proposition [as SCO] . . . for less money
>
> **TONY IAMS, ANALYST,**
> **D. H. BROWN ASSOCIATES INC.**

Caldera Makes Strong Debut; Analysts Say Others May Not

Called 'last hurrah' for Linux IPOs

BY DOMINIQUE DECKMYN

Despite the poor stock performances of late of some of its Linux brethren, Caldera Systems Inc. made a strong debut on Wall Street last week. But analysts disagreed on whether future initial public offerings (IPO) of Linux companies will fare as well.

After repricing its IPO at a range of $10 to $12 per share last Monday, up from one of $7 to $9, and then increasing it again, to $14 on Tuesday, Caldera saw its shares start trading at $26 on Tuesday and close the day at 29 7/16, up 110%. But the gains were nowhere near those of previous Linux IPOs, such as the offering of VA Linux Inc., which rocketed 733% on its debut in December.

Caldera's Losses

A year-to-year comparison of Caldera's financials for the quarter ended Jan. 31:

	2000	1999
Revenue	$553K	$538K
Net loss	$5.5M	$992K

SOURCE: UNAUDITED RESULTS FROM SECURITIES AND EXCHANGE COMMISSION FILING

"Nobody expected them to be a new VA or [Red Hat Inc.]" in terms of first-day gains, said Tony Iams, an analyst at D. H. Brown Associates Inc. in Port Chester, N.Y.

Nonetheless, Caldera's reception was enthusiastic, considering that both VA Linux and Red Hat have seen their stock sag in recent weeks.

"The days of 200% returns on Linux [IPOs] are gone," said Irv DeGraw, an IPO analyst at WorldFinanceNet.com Inc. in Sarasota, Fla. He said he expects Caldera to be "the last hurrah" for Linux IPOs, with the upcoming IPO of LinuxCare Inc. to see a more muted reception.

"I think we've seen the cream of the crop" of Linux IPOs, agreed Jeff Hirschkorn, an analyst at IPO.com Inc. But Hirschkorn said he believes that the good performance of Caldera will spike interest in LinuxCare, a professional services company.
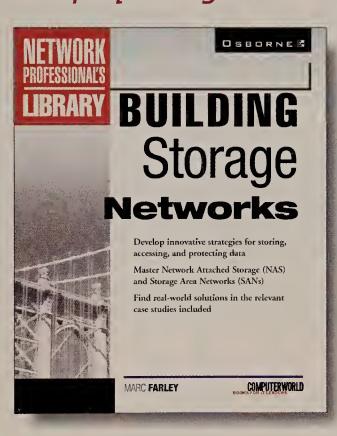
"A lot of people were waiting to see how Caldera did," Hirschkorn said.

Compared with other Linux offerings, Caldera stock is "priced very fairly," said Hirschkorn. He added that he expects the stock to rise steadily during the next few weeks to about $45 per share. But DeGraw said he thinks that it's more likely to move downward a little.

Like most of the companies that are riding the Linux wave, Caldera has yet to generate significant revenue from its products. For the year ended Oct. 31, it saw sales of $3 million and a net loss of $9.4 million. About 91% of its revenue was from software sales, rather than services, and sales have only limited potential because Linux distributions often sell for $50 or less. ▶

The old

rules

of business no longer apply

And neither do the old

operating

systems

PATRICIA KEEFE

Privacy: Fight for it

A BOSTON GLOBE COLUMNIST recently asked: "Is anybody really shocked anymore at how much marketers know about all of us?" Shocked? No. Appalled, yes. The columnist treats privacy like a joke, an antiquated concept in the face of technological advances. He says privacy is a nonissue, and he sees a benefit via personalization that targets his needs and saves him time.

That's fine — if that's a trade-off he's willing to accept. I'm not, and I am not alone. Privacy is not something you swap for convenience. We should fight like hell to hang on to what's left of it.

It amazes me that the same people who object to being followed around a department store don't mind if they are followed all over the Net. They would probably object if a prospective employer cruised through their credit and medical histories, but are blasé about having their every drugstore purchase online or having their medical information recorded and packaged up for sale.

How is this different? If anything, it's more insidious.

Privacy *is* a big deal — online and off-line. Just look at its impact on the amount of people expected to fill out the census. People don't believe the data will be kept confidential. Imagine!

The latest buzz is about building technol-

PATRICIA KEEFE is editorial director of *Computerworld*. You can contact her at patricia_keefe@computerworld.com.

ogy to build "trust relationships" with consumers. Except that trust involves being totally up front with the consumer about what data is collected and what you are planning to do with it and, oh yeah, allowing them to opt out of providing that data. OK, so they won't get targeted missives and a special page just for them, but they can still search the site on their own if that's how they want to waste their time. Seems fair to me.

After all, it's my time, and it ought to be my decision.

Sites like WinWin.com are on the right track. They make no bones about wanting your data, but they leave it up to you to participate, and they reward you if you do.

Meanwhile, does anyone else find it ironic that Europe — that hotbed of socialism and cradle-to-grave government programs, is the one standing up for consumer rights to privacy, while our legislators are ducking the issue? ▶

DON TAPSCOTT

More power in Net economy may shift to the people

FIRST IT WAS Beanie Babies up for auction. Now it's people. Privately held start-up eLance.com is gearing up to officially launch its Web site, which has been in beta testing since last summer. It allows independent contractors like graphic designers, editors, translators and even lawyers to peddle their services to the world.

We may end up looking back at the 20th century's integrated firm as a transitional structure that flourished for a brief moment in history. The fundamental unit of the economy seems to be reverting from the corporation back to the individual.

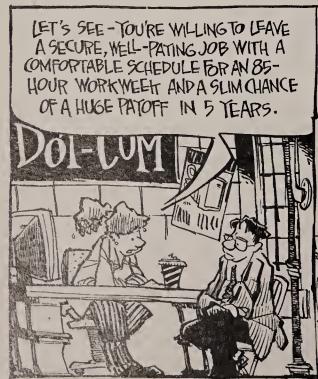Soon, independent contractors, rather than full-time employees in big companies, will perform most work. Such networked "e-lancers" will join fluid and temporary webs to design, produce, market and support goods and services. Corporate IT systems will have to be flexible enough to enable highly functional and secure links among a constantly changing cast of outside contractors.

DON TAPSCOTT is chairman of the Alliance for Converging Technologies (*www.actnet.com*) and co-author of *Digital Capital* (Harvard Business School Press), scheduled to be released in May. Contact him at dtapscott@actnet.com.

ELance.com shows how the Internet collapses transaction costs between different entities. Potential purchasers can issue requests for proposals (RFP) for the jobs they want done. Examples would be a company wanting a new logo or a sales brochure translated into a foreign language. Companies post their requirements on eLance and wait for bids to come in.

RFPs or calls for tenders for big-ticket expenditures are commonplace for governments and large companies. But until now, the practice didn't make sense for small purchases. Any savings captured by the bidding process was overshadowed by the time, cost and energy of assembling the proposal and alerting potential bidders.

No more. Answer a few questions on the eLance RFP template and bidders from around the world can compete for your business, no matter how small. Need a couple of professionally written job descriptions? You can have specialists around the world bid for the job. The cost to issue the bid is essentially zero.

ELance offers a reputation rating system similar to eBay's hugely successful Feedback Forum. On eBay, buyers and sellers acquire credibility by

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IF THAT'S AN EXAMPLE OF YOUR DECISION-MAKING SKILLS, WHY WOULD WE WANT TO HIRE YOU?

pointing to a prominently displayed history of successful transactions. Their online reputation is a critical asset and essentially constitutes a form of digital capital.

ELance is a type of business web I call the agora, or marketplace, where buyers and sellers come together to collectively "discover" the price of a good or service. A successful agora requires a critical mass of buyers and sellers who wish to exchange the same good or service during the same time period, and use the same mechanism to communicate and conduct price discovery.

This isn't as easy as it appears. It's why physical world transactions tend to be fixed-price retail or one-on-one haggles. But as eLance illustrates, the Net is perfectly suited to creating prime agora conditions. ▶

DAVID MOSCHELLA

XML shifts power to users, but can they handle it?

SOMETIMES YOU come up with an idea that you instinctively feel should be important, but you have to wait a while to realize why. For example, in 1995, it struck me that one of the most fundamental changes brought about by the Internet was that customers were getting on the Net because of what other customers were doing. In other words, technology users such as Amazon, Yahoo and ETrade were doing much more to draw people to the Web than technology vendors, such as Cisco, Microsoft or even AOL.

From a historical IT industry perspective, this shift in creating demand was clearly unprecedented, and it sure felt like a major change in our industry's value chain. But for several years, it was hard to get past the "so what" test. Why exactly did this matter?

It has only been in the last year or so, with the sharply rising interest in XML, that the significance of this customer-driven revolution has become clear. If users want to exploit the power of common metatags, shared ontologies, communicating applications and a more databaselike Web, they will have to do most of the work themselves. IT vendors will certainly have a vested interest in helping, but even today's market leaders will find it difficult to drive the

DAVID MOSCHELLA is vice president of knowledge strategy at Meansbusiness, an Internet start-up that's building a database of ideas. Contact him at dmoschella@earthlink.net.

necessary setting of standards.

And standards are what the XML movement is all about. Although much has been written about today's confusing mix of industry-specific initiatives and overlapping associations and institutions, I'm much more intrigued by a larger question. For more than 30 years, IT professionals and their corporate bosses have told IT vendors that they want interoperability and standards. But now that the standards burden has shifted to IT users themselves, will they be up to the task?

IT vendors have already taught us a great deal about what to expect. Over the years, most standards efforts have failed because IT vendors, understandably, find it difficult to balance their customers' clear interest in interoperability with their own competitive and business objectives. Indeed, one could argue that there have really been only three great standards successes, and that each involved either chance or government leadership or both.

For example, PCs became standardized because IBM totally dominated the computer business and carelessly decided to provide an open-architecture PC product. TCP/IP and the related Web standards grew out of government and university efforts largely unconcerned with commercial implications. And the international GSM (Groupe Speciale Mobile) cellular phone system emerged from close (although non-U.S.) government/vendor collaboration.

But in the end, all three standards processes resulted in vendors bringing specific products and services to the market. This, of course, is something vendors will continue to do. There are already many new companies trying to develop shared ontologies for specific markets and industries, and software giants such as SAP, Oracle and Microsoft will influence XML usage in a number of important ways.

But the big changes will have to happen at the customer level. In fact, many IT user organizations will soon find themselves in some very vendorlike predicaments, juggling the desire for interoperability with their own competitive interests. Looking back, it has taken several decades for standards to encompass most of the IT vendor business. But just because our industry now moves more quickly, standards won't necessarily evolve more smoothly. Indeed, many IT user organizations will soon learn what being an IT vendor has always been about. ▶

READERS' LETTERS

Internet speculators can learn from past

IN "DOMAIN Name Speculation Doesn't Merit Bad Image" [News Opinion, Feb. 21], John Zehr begins, "In 1626, Peter Minuit traded some useful but inexpensive household items for what would become one of the most valuable pieces of real estate in the world — Manhattan."

Actually, Minuit's transaction took place in 1624, and Minuit came out the loser: The Native Americans with whom he traded didn't own the land which they "sold" to Minuit, who envisioned a Dutch farming community on the island of Manhattan. Unfortunately, Manhattan's rocky soil doomed any attempt at agricultural viability, and the Dutch would lose Manhattan a few decades later to the British with absolutely nothing to show for their efforts on the island.

Indeed, Minuit might be the proper inspiration for the seemingly endless waves of Net-based entrepreneurs who are envisioning get-rich-quick schemes in cyberspace: a confused explorer in an alien land whose great plans eventually fizzle out.
Phil Hall
President
Open City Communications
New York
opencity@aol.com

JOHN ZEHR'S drawing of historical parallels between today's domain-name speculators and the prospectors of the California Gold Rush and the buyers of Manhattan borders on the delusional. How noble of him to return the domain names he registered that included trademarked business names to their rightful owners for free. I'm sure the new cybersquatting laws had no impact on his decision to do so.

A more accurate historical parallel for today's domain-name speculators would be the carpetbaggers who proliferated throughout the post-Civil War South,

profiting off the desperation and dysfunction of a war-ravaged economy.
Tom LaTourette
System Arts
New York
tlatoure@systemarts.com

Leap day not a problem

IT LOOKS LIKE Leap Day was another Y2k nonevent. I have one question: Why would anyone expect any problems? Any programmer who researched the Gregorian calendar and found that most century years aren't leap years would also know that this year was. Programs that assumed that years divisible by four are leap years work fine for the year 2000.
Bruce Wenner
St. Paul, Minn.

Facts about Linux

SIMON L. GARFINKLE'S column "Three Unixlike Systems May Be Better Than Linux" [News Opinion, Feb. 7] started

out well, but there were serious lapses in the editing and research.

Most important, Linux is just the kernel, and almost everyone using Linux installs a distribution that includes a lot of additional free software.

Second, it isn't true that all of the Linux distributions have the same GUI. In fact, Red Hat includes both GNOME and KDE.

Third, the reference to "automatic memory allocation" is surprising, since memory allocation has been a feature of Unix for decades.
Shmuel (Seymour J.) Metz
Annandale, Va.
shmuel@acm.org

COMPUTERWORLD welcomes comments from its readers. Letters shouldn't exceed 200 words and should be addressed to Jamie Eckle, letters editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax: (508) 879-4843. Internet: letters@computerworld.com. Include an address and phone number for immediate verification.

GEOFFREY JAMES

Staffing challenges call for new breed of IT manager

THINK YOU CAN ATTRACT top IT talent by dangling a big salary? Think again. With e-commerce becoming the hottest technology trend since the PC, many candidates are looking for more than just a job — they want a piece of the action. And that means IT managers will need to develop a whole new set of skills for themselves.

With the Internet increasingly dominating our high-tech economy, top IT professionals are being snapped up by dot-com start-ups that offer not just jobs but also highly attractive stock options. While it's true that such jobs entail risk, today's job market is so out of control that there are always a dozen opportunities waiting in the wings, even if the dot-com flops.

GEOFFREY JAMES is the author of *Success Secrets from Silicon Valley* (Times Books, 1998). Contact him at www.geoffreyjames.com.

So, traditional IT departments are at a disadvantage when trying to recruit personnel to work on e-commerce applications, because the best candidates are likely to want deals that are sweeter than what corporate guidelines allow. As a result, some companies are taking their cues from the dot-competition and spinning off their e-commerce groups into separate businesses to attract the brightest and the best.

For example, Wal-Mart — a company with a worldwide reputation for advanced data processing — has decided to spin off Walmart.com. The idea, according to James Breyer, managing partner at Accel Partners, the Palo Alto, Calif., venture capital firm that's recruiting Walmart.com's management team, is to "greatly accelerate the Web development effort and attract true world-class management and leadership to the new company."

Even big accounting firms — which never had any trouble attracting top talent to their IT consulting practices — are struggling with this issue. For example, employee demands for liberal compensation drove the Big Five to start compensating employees by awarding them stock in the companies that those accounting firms were trying to help. But the Securities and Exchange Commission didn't like that. The agency felt the pay plan might create a conflict of interest if the accounting firm that was auditing the books had employees who owned significant stock in the client company.

Because of this, three of the Big Five are restructuring their IT consulting practices. KPMG and PricewaterhouseCoopers are spinning their consulting businesses into separate companies, while Ernst & Young is selling its consulting business outright to Cap Gemini. Andersen Consulting was for years separate from its erstwhile parent Arthur Andersen, leaving only Deloitte Touche Tohmatsu still trying to be a one-stop shop. These changes illustrate that top IT professionals simply aren't willing to settle for business as usual, according to Ernst & Young spokesman Larry Parnell. "Employees would rather work directly for the start-up [than] hang around for years waiting to become a partner," he says.

The fact that IT employees now want a piece of the action means that IT managers will need to learn a truckload of new skills. Gone are the days when an IT manager could act like a character in "Dilbert." It won't be enough to run a department; the IT manager of the future will also need to know how to build a business. Thriving in this brave new world will mean cutting deals with venture capitalists, building business plans that make sense and creating corporate cultures that can innovate quickly.

In other words, attracting and retaining top IT candidates will mean giving more than lip service to those promises that computers will change the way your company does business. Are *you* ready? ▶

WILLIAM ULRICH

Legacy systems must support key business initiatives

LEGACY SYSTEMS have survived mergers, acquisitions, divestitures, re-engineering efforts, technical revolutions, industry realignment and Y2k. These systems, some dating back to the 1960s, remain the mainstay of information management capabilities, even as companies focus on e-commerce opportunities.

With the bulk of a company's information knowledge base locked up in these legacy systems, IT must interface, integrate, migrate and/or retire them before they hinder ongoing business strategies.

WILLIAM M. ULRICH is a management consultant and president of Tactical Strategy Group Inc. Contact him at tsginc@cruzio.com

Some people think "legacy" is synonymous with Cobol, but there are hundreds of legacy languages, many of which (such as assembler and C) are harder to decipher than Cobol. And legacy systems aren't just restricted to the mainframe. They've expanded to include Java, XML, network environments and a host of evolving categories.

The foremost legacy systems challenge is the need to articulate their value and identify what role they'll play in future information initiatives.

Legacy systems are easy to ignore, until IT is forced to confront them. Y2k made us pay attention to legacy systems, and now e-commerce and back-end integration requirements are forcing us to pay attention again. Creating an order-processing Web site is a manageable task, but ensuring that orders are posted, inventory is in stock, fulfillment is ensured, distribution is verified and payment is received requires back-end systems integration. Linking e-commerce applications to legacy systems is a challenge facing numerous industries in the business-to-consumer and business-to-business areas. And this has put the legacy systems challenge back on the IT agenda.

Addressing these challenges requires understanding legacy data and system functionality at an enterprise level and down to a granular level, so any project team can interface with, capture and reuse legacy data and business rules when needed. With a common reuse, integration and migration strategy, project teams could quickly distinguish between valuable, redundant, obsolete and irrelevant data and business rules. A framework for meeting these challenges is essential.
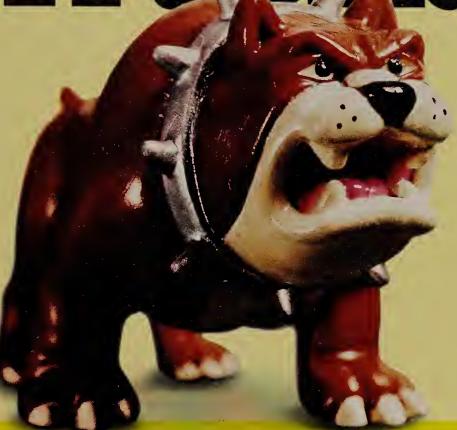
As a first step, organizations should create a "systems knowledge base," or map, of an enterprise-computing environment. They could then, for example, have accurate depictions of the systems, data and business rules invoked under various transactions. Analysts would be able to determine the legacy components needed to interface with, be reused under or be replaced by an e-commerce application. The systems knowledge base would reside in a commercial repository or database, be loaded and updated using commercially available analysis tools and accurately depict all production environments.

This knowledge base would include all physical systems components, business data and rule definitions and relations. Analysts could use and update the information as they plan and deploy system upgrades, migrations, integrations and e-commerce projects. While the tools for capturing and consolidating information within this knowledge base could be built using mostly commercial technology, a strategy would have to be developed to deploy this information across projects.

The legacy systems challenge must be tackled at an enterprise level because the installed base of systems and related data is too interdependent to tackle from a one-department perspective. This requires a comprehensive strategy for dealing with legacy systems across business units. Executives must craft a phased transition plan where immediate value can be gleaned from the systems knowledge base, while focusing on long-term goals for these systems.

Long-term goals include, for example, shifting to component-based development paradigms. A central architecture team must drive and monitor progress toward these goals using the systems knowledge base as an enabling tool. Applications management, e-commerce project teams and architecture planning teams should synchronize efforts under this common strategy. This will ensure that legacy systems support — and don't hinder — critical business initiatives. ▶

Farewell to the floppy disk? Maybe not, readers say

I READ MARK HALL'S editorial ["Farewell, floppy," News Opinion, Feb. 28] with interest. While use of the floppy drive is becoming infrequent, it still remains a critical component in the support area.

I am manager of support services for a Fortune 1,000 corporation, and my company uses the Drive Image software and Partition Magic software extensively to provide support, backup and data movement.

Until CD-RW drives become much less expensive, I think the floppy will continue to play a critical role in the support process.
Lawrence Mann
Georgia Gulf Corp.
Baton Rouge, La.

I READ THIS PIECE on the exact same day I received a brand new book on strategic planning that included — no kidding — a floppy disk. The "puny amount of data" was extremely beneficial and contained several useful worksheets.

I'm glad our IT manager didn't "rip out every floppy drive on every desktop" as Mark Hall proposed, otherwise I might still be trying to convert data instead of working on a strategic plan.
Bret L. Popper
Senior business consultant
Park Ridge, Ill.
bpopper@wwa.com

FLOPPY DRIVES ARE far from useless. Using a boot disk to get on the network for a server-based deployment is something I'm sure a lot of IT support people still do. And when a Windows 95/98 PC has a serious operating system problem, getting on with a boot disk that has a few basic utilities can be very helpful in repairing it — or at least allow you to remove critical files.
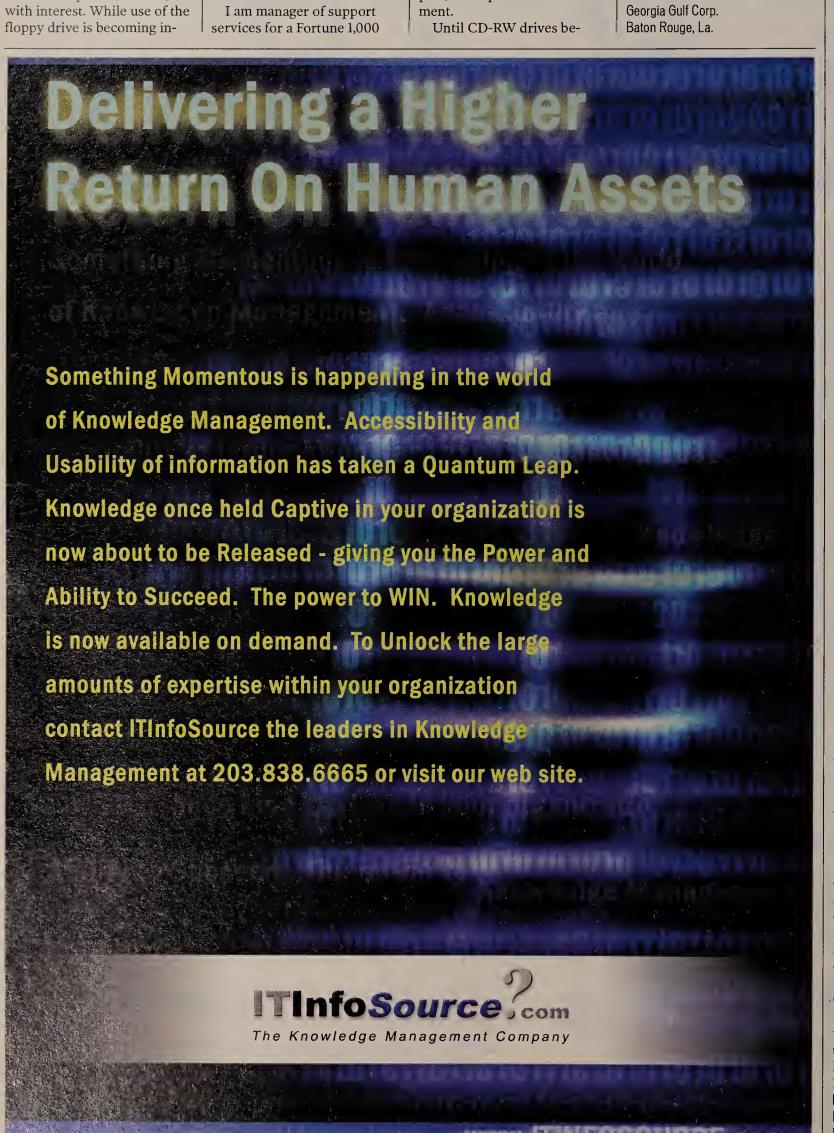
Floppy drives are dangerous entry points for viruses, but isn't it more likely that a company will get viruses transmitted via e-mail? And floppy drives are exit points for information, but the editorial also noted that 1.44MB is "just a spit in the ocean of information today."

Also, what's to stop a person from surfing to his free e-mail account and attaching information to an e-mail document to himself?
Tom Casten
Rolling Meadows, Ill.
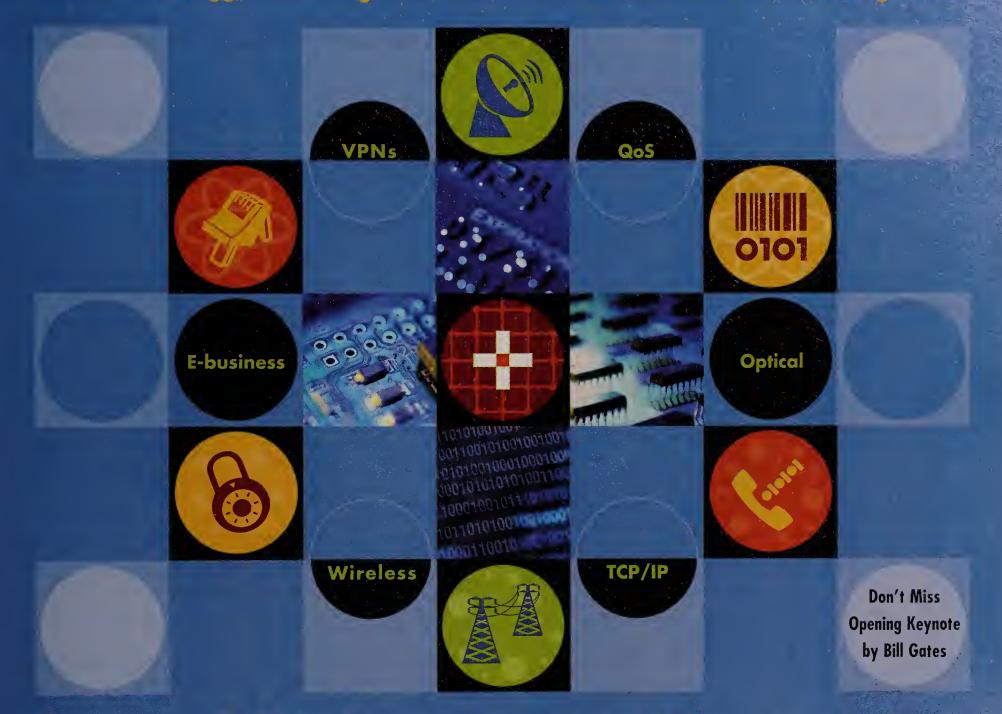
WHEN OUR SMALL business moved, it took us over a week to get the home network and office network back up to snuff. Rather than miss half our client appointments during moving week, we just shagged floppies for a few days, getting back to networking when it was convenient. Of course we used the new fast connections (once they were up) to shuffle files, but the floppies were a necessary kludge for the time being. Irrational? I think not.
Bill Skeels
LawSight.com
Raleigh, N.C.
bskeels@lawsight.com

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Windows 2000

Online This Week

Global QTEST network opens Windows 2000 doors to users

When you combine Compaq's Windows 2000 expertise with the eagerness of its Services organizations to help customers, one result is QTEST, a dynamic global Windows 2000 environment with 150 servers.

Windows DNA 2000: Linchpin in Microsoft's e-comm strategy

Windows Distributed interNet Application (DNA) is a conceptual model and a family of products that embrace a number of products and technologies targeted primarily at e-commerce Web sites. When fully developed, Windows DNA 2000 will offer these sites scalability, load balancing, partitioning and application integration.

When to use different Active Directory models

In our latest Closer Look installment: Windows 2000 makes it possible to configure the enterprise in many different ways. Since no two enterprises are identical, successful deployment is based on an understanding of how to employ Active Directory's flexibility, scalability and granularity.

Quickpoll In the wake of the record-breaking TPC-C test results earned by a dozen interconnected ProLiant 8500 servers running Windows 2000 Advanced Server and SQL Server 2000 Enterprise, do you feel more confident in Windows 2000's scalability?
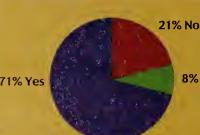
Cast your vote now at

www.Windows2000Advantage.com.

Check out ▶ the current results: *Base: 52*

71% Yes
21% No
8% Don't Know

Microsoft **COMPAQ**

Produced by **COMPUTERWORLD**
ENTERPRISE BUSINESS SOLUTIONS
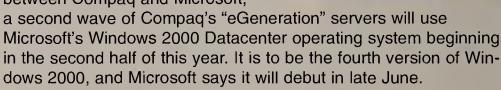
Compaq, Microsoft building ProLiant Datacenter strategy

By Steve James

In an effort to empower Internet-based customers, Compaq's ProLiant "eGeneration" strategy is targeted at bringing ProLiant servers into a market now dominated by mainframe and midrange servers. As part of this strategy, Compaq is introducing 32-processor servers for large Internet and e-commerce applications that need higher performance, reliability and scalability.

As part of a joint program between Compaq and Microsoft, a second wave of Compaq's "eGeneration" servers will use Microsoft's Windows 2000 Datacenter operating system beginning in the second half of this year. It is to be the fourth version of Windows 2000, and Microsoft says it will debut in late June.

Datacenter supports up to 32 processors, compared with eight processors supported by Advanced Server. Datacenter also supports 64 gigabytes of memory compared with Advanced Server's eight gigabytes.

Compaq's goal is to improve server reliability, availability and scalability so its ProLiant servers can be used in place of mainframe servers or midrange servers that now cost $1 million to $3 million, says Tim Golden, director of enterprise server product marketing at Compaq.

For comparable computing power, Compaq machines cost less than half as much as the mainframe and midrange machines, and over time Compaq expects the ProLiant prices to drop to one-third or one quarter of the competing price, Golden says.

Chris Ray, Microsoft product manager for Windows 2000, says the two companies share the price-slashing goal and have developed the strategy to achieve it. "Compaq and Microsoft feel we can drive prices down and still provide high levels of reliability," Ray says.

Compaq's 32-processor servers are based on the Unisys Cellular Multi Processing (CMP) architecture. That's a switch from Compaq's eight-processor servers, which use Symmetric Multi Processing (SMP) architecture.

The switch is being made on the new servers because the CMP architecture will enable Compaq to configure a machine as one 32-processor unit or to partition the machine into smaller units so that it functions as two 16-processor servers or four 8-processor servers. When partitioning is done, each set of processors runs its own operating system.

A third generation of ProLiant servers scheduled for release next year will scale beyond 32 processors, Compaq says.

The ProLiant-branded Compaq servers will be tested with Windows 2000 Datacenter and delivered to the customer with a Microsoft certification that machine and operating system will work together for optimum performance. ▶

For the full text of this story, visit **www.Windows2000Advantage.com**.

ADVANTAGE

▶ CASE STUDY

Alibre Win 2000 network stands up to the acid test

By Elisabeth Putnam

Early in February, Alibre Inc. was just a few weeks away from Zero Hour, when the company's Web-based mechanical design application service, still technically in beta, would become generally available on the Internet. "The point of this next beta is to really tax our system, test how many users we can support," says Laura Herrick, Alibre's vice president of operations.

Alibre executives expected, in fact hoped, that the test would be an arduous one. Fortunately, the application service provider was getting some powerful publicity just prior to its launch. Alibre was one of three applications demonstrated in Microsoft Chairman Bill Gates' keynote at the Windows 2000 introduction. "We're hoping to get thousands of new users," Herrick says.

To ensure prompt, trouble-free access to its Web site and application services, Alibre needed a powerful, scalable server infrastructure, Herrick says. "It's rather like giving a large party when you're not really sure how many guests to expect. You need to have a lot of backup supplies on order so you don't run short."

Alibre made two key design decisions early on, to ensure it could meet the needs of its "guests" now and over the long term. First, it standardized its application architecture on Microsoft Windows NT and Windows 2000. Second, it selected managed Web hosting service provider Data Return to build, manage and operate the underlying Web platform.

Alibre offers a unique, Web-based business model that enables companies with limited budgets to make use of sophisticated mechanical design tools without paying for expensive software and server hardware upfront, according to Steve Emmons, Alibre's vice president of development. Instead, customers pay for service on an incremental, per-user, per-year basis.

Using Internet Explorer on a Windows client, users go to Alibre's Web site, receive authorization and download the client that allows them to interact with various Web site pages.

As a Web-based service, Alibre can provide customers with the kind of ongoing, personalized support rarely offered by mechanical design software vendors, Herrick says. "We're just a click away." Support includes webcasts on how to use the design tools and services and online trading. ▶

For the full text of this story, visit **www.Windows2000Advantage.com**.

Point of View

Microsoft, Compaq 'in lockstep' on Windows 2000

By Bruce Hoard

If there was one ringing message transmitted by the keynote speeches of Compaq CEO Michael Capellas and Microsoft Chairman and Chief Software Architect Bill Gates during the launch of Windows 2000, it was this: When it comes to Windows 2000, Compaq and Microsoft are moving — in the words of Capellas — "in lockstep."

That unity can be seen from several angles. In breaking news at the recent Windows 2000 Conference and Expo in San Francisco, Gates announced that Windows 2000 had set a world record on the highly respected and independent TPC-C benchmark test, processing 227,079 order transactions per minute. It did so running a Windows 2000 system based on 12 Compaq ProLiant servers and SQL Server 2000 in a scale-out configuration.

In the trenches

Why Compaq? Because when it came time to get down and dirty with scalable, reliable hardware that could go where no hardware had gone before, Microsoft chose Compaq. It's that simple. As Gates noted, "Our competition and our customers will be amazed by this."

In order to appreciate how Compaq and Microsoft are moving in lockstep toward the future, it is illustrative to review how they have mirrored each other in the past. Both companies have made extensive internal commitments to Windows 2000. Referring to Compaq's participation in the Rapid Development and Joint Development programs, Capellas declared, "We've got 18,000 clients and 360 servers running Windows 2000, and I can tell you it's gone very well." Compaq is also a Global Launch Partner and Microsoft's only Worldwide Prime Integrator for Windows 2000.

For his part, Gates noted that Microsoft has been eating its own dog food in a big way for nine months since it converted 70,000 internal desktops to Windows 2000.
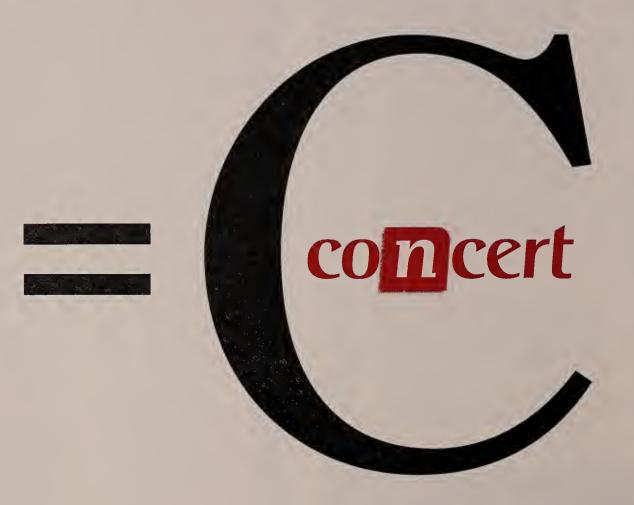
Both leaders also directed many of their remarks at the need to create a stable and scalable Internet infrastructure. ▶

For the full story, visit **www.Windows2000-Advantage.com**.

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BUSINESS

COCKPIT VIEW

When designing fighter aircraft, coordination is a must. At Lockheed Martin, a new database is helping the company get a multidimensional view of information on everything from labor to parts to staffing, so it can fine-tune processes and cut costs. ▶ **46**

STRUGGLING SUPERMARKET

Now that Peapod Inc. has faced its financial woes head-on, the company is racing to replace $120 million in failed funding deals. ▶ **46**

KEEPING PACE

After two centuries as a trendsetter, the New York Stock Exchange is investing millions in technology to keep up with competitors. The first of its new systems is set to be launched next month. ▶ **48**

TOUGH SELL

Installing new customer relationship management software isn't a problem, say users. The real challenge is making it mesh with the business side. ▶ **50**

TECHNOLOGY FAD OR REVOLUTION?

Where were all the big boys when cell phones came on the scene? Nowhere in sight. For businesses to keep an edge in the IT world, they must learn to spot new technology waves at the onset, says Jim Champy. ▶ **52**

NIGHT SHIFT

Almost half of all working women say they barely have time to spend with their spouses or significant others. In today's around-the-clock world, odd hours are a given. But the demand for people to fill technical jobs allows IT workers to set their own schedules. ▶ **52**

HUMAN CAPITAL

When Skandia saw its assets drop, the financial services and insurance company found a gold mine in its people. Now, the company uses IT to capture its real worth. ▶ **58**

ROADS TO SUCCESS
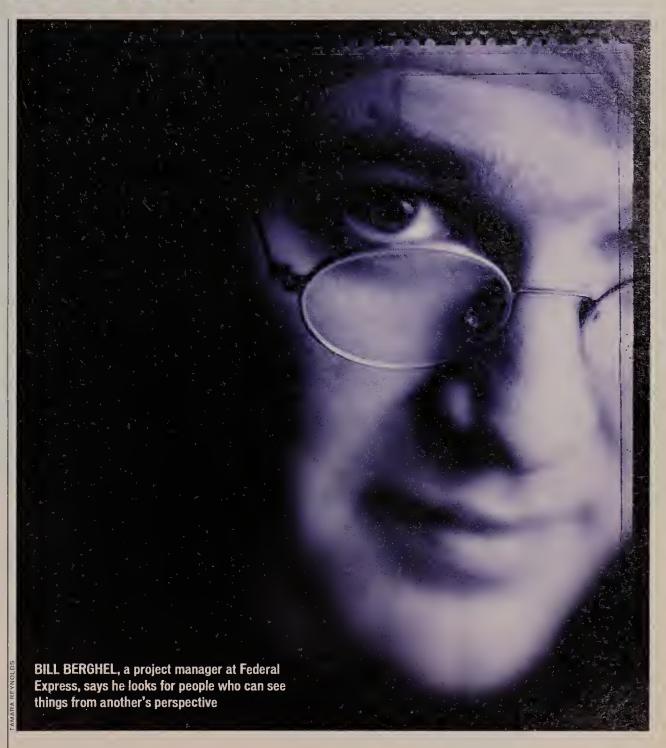
The market for IT consultants is exploding. If you're looking for a little variety on the job, this career path offers a range of opportunities. Veterans in the field offer advice on the best and worst career moves for consultants. ▶ **60**

AFTER HOURS

As the demand for late-night and early-morning trades increases, after-hours stock markets are growing in popularity. But the new markets still have a ways to go, say analysts. ▶ **57**

CAREER ADVISER

Is your new CIO clearing out the existing staff to bring in his old cronies? What's the best way to market yourself to start-ups? Fran Quittel offers some advice. ▶ **68**

TAMARA REYNOLDS

BILL BERGHEL, a project manager at Federal Express, says he looks for people who can see things from another's perspective

SPOTTING BORN LEADERS

SOME HAVE IT. SOME DON'T. You can train employees to excel on the job, but expecting them to effectively take charge is another story. Recognizing who does and who doesn't have the potential to be a project manager isn't easy, but there are some surefire ways to spot diamonds in the rough.

62

New Tools Help Lockheed Martin Prepare for Takeoff

Database helps fine-tune plane production, cut costs

BY JAMES COPE

WHEN YOU DESIGN and build high-performance fighter aircraft like the Lockheed Martin F-16 and F-22, gathering information about processes, parts and procedures is critical to producing a superior airplane while controlling costs.

But that's hard to do when your critical data is scattered all over the place and there's no systematic way to analyze it, said Peter Wynne, who is the director of product management integration at Lockheed Martin Aeronau-

WYNNE: OLAP cut analyst labor costs

tics Co. in Fort Worth, Texas.

To solve the problem, Lockheed Martin last year decided to centralize data on Hyperion Essbase, a database developed by Hyperion Solutions Corp. in Sunnyvale, Calif. Essbase and its accompanying suite of tools employ online analytical processing (OLAP) technology.

OLAP lets users from engineering, purchasing, manufacturing and other areas in the company examine data relative to aircraft design and manufacturing from a multidimensional view. The system has helped cut analyst labor costs by as much as 15% to 20%, Wynne said.

"OLAP provides a way to evaluate project costs, technical performance and risk for different airplane programs," said Wynne.

For instance, he said, managers can look at the materials used to make the leading wing flap on a fighter aircraft, then analyze manufacturing time, cost and other variables. This way, they can pinpoint problems and work on better meeting deadlines, cutting costs and fine-tuning production in the future.

"We also have the capability to measure the unit cost of an F-16. We can go into the various factory databases and pull out costs per unit and look at those over time," Wynne said. "We can see how that [cost] might change, vary or get better through implementation of efficiencies."

Essbase can also help the company analyze costs and production to determine which processes would best be outsourced, said Wynne.

And it can be applied across aircraft programs, he added. Many of the lessons learned on the F-16, for instance, can be applied to the new Joint Strike Fighter that Lockheed Martin is developing for branches of the U.S. and U.K. military.

Lockheed Martin also uses Essbase for staffing forecasts. "We have about 1,000 integrated product team leaders," Wynne said. They input their staffing needs, and the OLAP system can match them "almost down to the skill level." ▶

MULTIDIMENSIONAL ANALYSIS of processes can help in designing Lockheed's F-35 Joint Strike Fighter

Peapod Online Grocer Is Wilting

BY SAMI LAIS

With cash reserves dwindling, online grocer Peapod is working "round the clock" to replace a $120 million funding deal that fell through recently, said a Peapod spokesman.

Estimates of how much time Peapod Inc. in Skokie, Ill., can buy with its $3 million in cash range from 30 to 45 days, depending on what its debts are. Peapod's board of directors last week said it had directed its financial advisers to find alternative financing or a buyer.

On March 20, a class-action suit against Peapod was filed in the U.S. District Court in Illinois on behalf of those who bought securities in Peapod from Nov. 8 to March 16. The suit charges Peapod's officers with "misrepresenting its cash funding needs."

But Peapod's woes "are not an indictment of online grocers," said Barry Stouffer, a food industry analyst at J. C. Bradford & Co. in Nashville. "From a consumer standpoint, it's a great service, a great time-saver," Stouffer said. "There just aren't enough people using the services yet to provide the scale."

Analyst Jennifer Marino at eMarketer, an e-commerce market research firm in New York, said she agreed. "It's easy in New York City, where you have the population density," she said. "The challenge comes in bringing less urban areas online."

Proprietary inventory and distribution software is a "linchpin" in the profit strategy of San Francisco-based Peapod competitor Webvan Inc., said Webvan spokesman Bud Grebey.
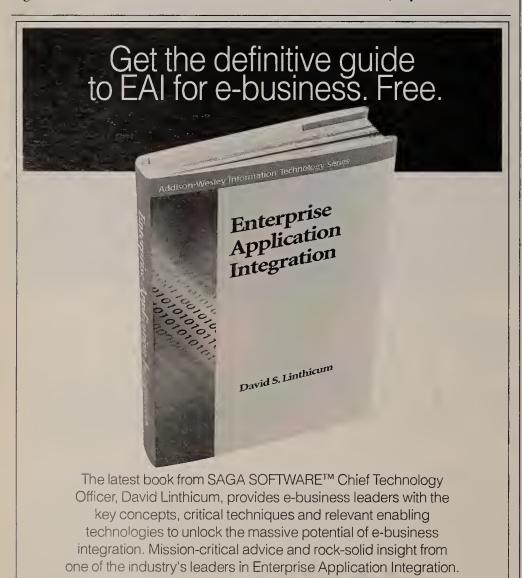
Webvan licenses software, including Web fulfillment and logistics software from The Descartes Systems Group Inc. in Waterloo, Ontario, and "bookends it with our own proprietary coding," he said.

A customer specifies a 30-minute delivery window for an order, and software determines when each item must be pulled so the whole order arrives at once for packing and delivery.

But Stouffer downplayed any edge such software might provide. Profitability "will come down to making the math work," he said. A 100,000-square-foot facility must generate $150 million in annual sales, but "none have proven they can meet that target," he said

Ironically, Peapod had just finished its most successful quarter. Sales were up 46% and margins had improved from 25.4% to 21.8% in last year's fourth quarter, former Peapod CEO William Malloy said in a statement released before he unexpectedly resigned last week due to health problems.

Peapod lost $28.5 million last year, but its competitors fared far worse: Webvan lost $76.3 million and Kirkland, Wash.-based HomeGrocer Inc. lost $84 million. ▶

YOU HAVE MAIL

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MAXIMUM SECURITY FOR THE E-WORLD

Under Pressure, the NYSE Moves Online

BY MARIA TROMBLY

The New York Stock Exchange plans to begin offering limited Internet access to its broker members and some of their customers by late April.

It's a big move for the more than 2-centuries-old stock exchange, which is under increasing pressure from all-electronic trading networks. While 90% of the NYSE's trades are tracked electronically, 10% are not.

To make the exchange more competitive, the NYSE has invested millions in new technology, pushing the company into the red in the fourth quarter by $800,000 — its first quarterly loss since 1991.

Common Access Point, the first part of the NYSE's new electronic initiative, is a $15 million extranet that will let brokers use industrywide standards — TCP/IP and Financial Information Exchange (FIX) — to communicate with the exchange, rather than rely on the proprietary systems and order forms currently used.

Also planned for next month is the rollout of Institutional XPress, which the NYSE will use to send out bulletins and information about stocks, explained Santo Famularo, the NYSE's vice president of infrastructure technology.

Capacity shouldn't be a problem, said Famularo, because customers won't be able to use the system interactively to request more quotes.

In July, the NYSE plans to implement financial industry standards-based communications for the Common Message Switch, which is used to send electronic orders to the NYSE point of sale.

Then, in the fall, the NYSE expects to capture the final 10% of trades that aren't being tracked electronically with its new Front End Systemic Capture program, which still needs approval from the Securities and Exchange Commission.

Despite the changes, Famularo said, the NYSE has no plans to eliminate the floor.

"In our vision, the trading floor continues to be the main mechanism for the exchange," he said. ▶

NYSE Initiatives

Rollout of new electronic systems:

APRIL

Common Access Point, an extranet bridge to NYSE customers' networks

Institutional XPress, a multicast with stock information and quote updates of more than 25,000 shares

JULY

TCP/IP connectivity to FIX and Common Message Switch standards

FALL

Front End Systemic Capture, which will track the 10% of orders that aren't submitted electronically

Meshing CRM, Business Poses Challenges

BY CRAIG STEDMAN

Osram Sylvania Inc., a lighting manufacturer in Danvers, Mass., this spring plans to be one of the first users to install pieces of SAP AG's new customer relationship management (CRM) software.

The prospect of rolling out the applications doesn't faze Mehrdad Laghaiean, vice president of information technology at Osram Sylvania. "From a software point of view, we're ready for whatever SAP throws at us," he said.

But the business side of the equation is more complicated. Like several other companies, Osram Sylvania is finding that dealing with the business issues created by CRM systems can be a bigger challenge than installing the software.

SAP's applications will let lighting buyers use the Web to place orders directly with Osram Sylvania, instead of having to negotiate prices with multiple distributors. But the company still wants its network of distributors to deliver and service the products.

"A lot of people have to understand how to [use] this," Laghaiean said. "It's not a simple supply chain, and we're adamant that we don't want to do something to harm our relationship with the distributors." In the end, he added, business managers will have to make the call on how the new system will actually be implemented.

For Moore Corp. in Toronto, installing CRM software in its Canadian and U.S. operations took just a matter of months. But Tom Doerner, design director for sales solutions at the maker of business forms, has had to labor long and hard to sell executives and end users on the merits of the system.

The system, based on software from StayinFront Inc. in Fairfield, N.J., costs more than $2 million per year to support and upgrade. And Doerner said the chief financial officer was skeptical about its value because of earlier sales initiatives that hadn't paid off.

Statistical Support

Doerner eventually developed statistics that showed that heavy users of the software bring in 25% more new business than other salespeople. But even that hasn't convinced all 1,400 members of the sales staff to use the software. Doerner said about 30% still don't log onto the system daily. So now he's developing new measurements in an effort to show that heavy users make more money.

Enterprise resource planning systems prod most users to adopt standard business procedures that are built into the software for back-office tasks such as accounting and inventory management. But front-office sales and marketing activities aren't as codified as back-office jobs, and CRM systems need to be more flexible, said Joshua Greenbaum, an analyst at Enterprise Applications Consulting in Berkeley, Calif. ▶

WORKSTYLES

The Downside of 24/7 Service

For two months, Miriam Boucher kept her expectations real low.

If she could get home, eat dinner and still have enough time to catch a few winks, it was a good day.

Boucher, a quality assurance engineer at Burlington, Mass.-based Foliage Software Systems, was working on a classified aviation industry project and had little choice but to pull 70- to 75-hour workweeks.

She saw her husband, Robert, on Sundays and before bed. That was about it.

Boucher is far from alone. A January poll commissioned by the AFL-CIO found that 46% of women who are married or living with someone see their significant others only in passing because they work different hours.

"We knew that this was happening," said AFL-CIO spokeswoman Lane Windham. "But nobody dreamed that the numbers would be this high."

There are probably two factors behind the findings, Windham said. Dual-career couples are struggling to balance work and child care. And 24-hour service has become the norm.

While the survey (a random nationwide telephone sample of 765 women, with a 3.5% margin of error) found that women in lower-paying service jobs are the most likely to work unusual hours, women in all fields seem to be affected.

Round the Clock

In information technology, 24-hour help desks and middle-of-the-night server crashes require off-hour workers.

"Partly, it's choice," said Windham. "But the other issue is that people are doing it because they're forced to take jobs in this service economy, which is not 9 to 5."

Things are back to normal for Boucher now, she said, but it's just a matter of time before she gets sucked into her next all-consuming project.

"Yup. I see it happening again. And no, I don't have any flexibility," she said.

Such demands are not unusual for women in IT, said Kristine Hanna, co-founder of Girl Geeks Inc., a San Francisco-based career training and mentoring organization. At many companies, there's only about one female engineer for every 100 males, and there's pressure to compete.

But, said Hanna, with so many IT jobs out there, companies are actively recruiting women, and they're willing to make work manageable – with flextime, job sharing, telecommuting – to attract them.

"People who aren't in IT have this image of somebody sitting behind a computer in a little cubicle for 24 hours a day with no contact with the outside world," she said. "That's not the case."

Women's World

Girl Geeks just completed its own survey looking at what women want in the IT workplace and plans to release the findings this week.

The survey shows that most IT jobs are very flexible, said Hanna. "A lot of these women are able to work out of their homes," she said. "They're essentially creating their own time, their own schedules, their own world."

IT workers have another edge, said Barbara Gomolski, research director at Eden Prairie, Minn.-based Gartner Institute Inc. Because they are more technologically savvy, they are more likely to telecommute.

"Partly it's the technology," said Gomolski. "We've got PalmPilots. We've got laptops. We're able to stay more connected than people in other professions." – *Melissa Solomon*

Irregular Hours for Women

Percentage who work evenings and/or weekends:

Among those who earn less than $25k/year	42%
Among all working women	28%
Among those with children under 19	26%

Base: 765 women 18 and older

JIM CHAMPY

Catching tech waves

"WE'RE STRUGGLING," the executive said. "We missed a technology cycle." The lament came from the CEO of a software company when I asked how business was going. Somehow, his company had failed to update its products to take advantage of a new generation of operating systems. As a result, the company was having a hard time competing. It probably would survive, but it would be playing an exhausting game of catch-up for some time.

I wasn't surprised that it had missed a wave. Both producers and consumers often fail to act when a new technology, whether an opportunity or a threat, presents itself.

A stunning example is the failure of every major telecommunications company to act early on two of the biggest technology developments of our time: cellular phones and the Internet. The initial cellular players turned out to be the "wireless" companies, not the established phone companies. And the Internet became the turf of the AOLs and other Internet service providers. The big telecoms have had to spend billions to buy their way into the game.

Theories abound as to why technology producers and consumers sometimes miss a wave. If you're a big producer, there's the risk of arrogance and believing that almost any new technology is too insignificant to deserve your valuable attention.

The new stuff is seen as toys and, of course, is always initially small in scale. I think that's what happened with cellular technology and the big telecoms. It may have been only Nokia and Motorola that saw that almost everyone would soon be carrying a pocket phone.

Some producers and consumers see new technologies as threats to their businesses. Managers are capable of predicting the dramatic effect that a technology might have on their industries but can be slow to react. Maybe the change will come on the next person's watch, they rationalize. I believe bankers have behaved that way for years, denying the immediate impact the Internet will have on the financial services industry.

And sometimes, corporate IT leaders just see a new development as too risky. So they spend millions on old stuff to be safe. After all, Bill Gates himself is reputed to have said that the difference between old and new technology is that the old technology works.

But missing a technology wave today can be costly. So when you see an opportunity, how do you know when to act, to catch the wave? Were the folks at Nokia just lucky? What did it take for ETrade to launch?

My friends in academia would answer that some combination of foresight, inductive reasoning, brilliant strategy and good planning was at play at all these companies. Cynics would say that it might have just been dumb luck. But I believe that people who catch a big technology wave and win have two qualities: They're more prepared than lucky, and they tend to be unabashedly optimistic. These qualities are often innate, but they can — and must — be acquired.

In the world of IT, being prepared means having a good sense of what's going on — both with technology and around your industry. Prepared people see and understand risk, where the unprepared wouldn't have the courage to act.

Optimism can also be learned. Just remember that very few new technologies get adopted without some bumps along the way. When challenged, do you think that the high priests of Linux believe that the world is conspiring against them or that they take setbacks personally? They see problems as natural events and expect them to be overcome tomorrow. Of course, hard work and discipline are necessary, but all setbacks are temporary. That's the way an optimist thinks.

Like surfing, catching a technology wave is an acquired skill. ▶

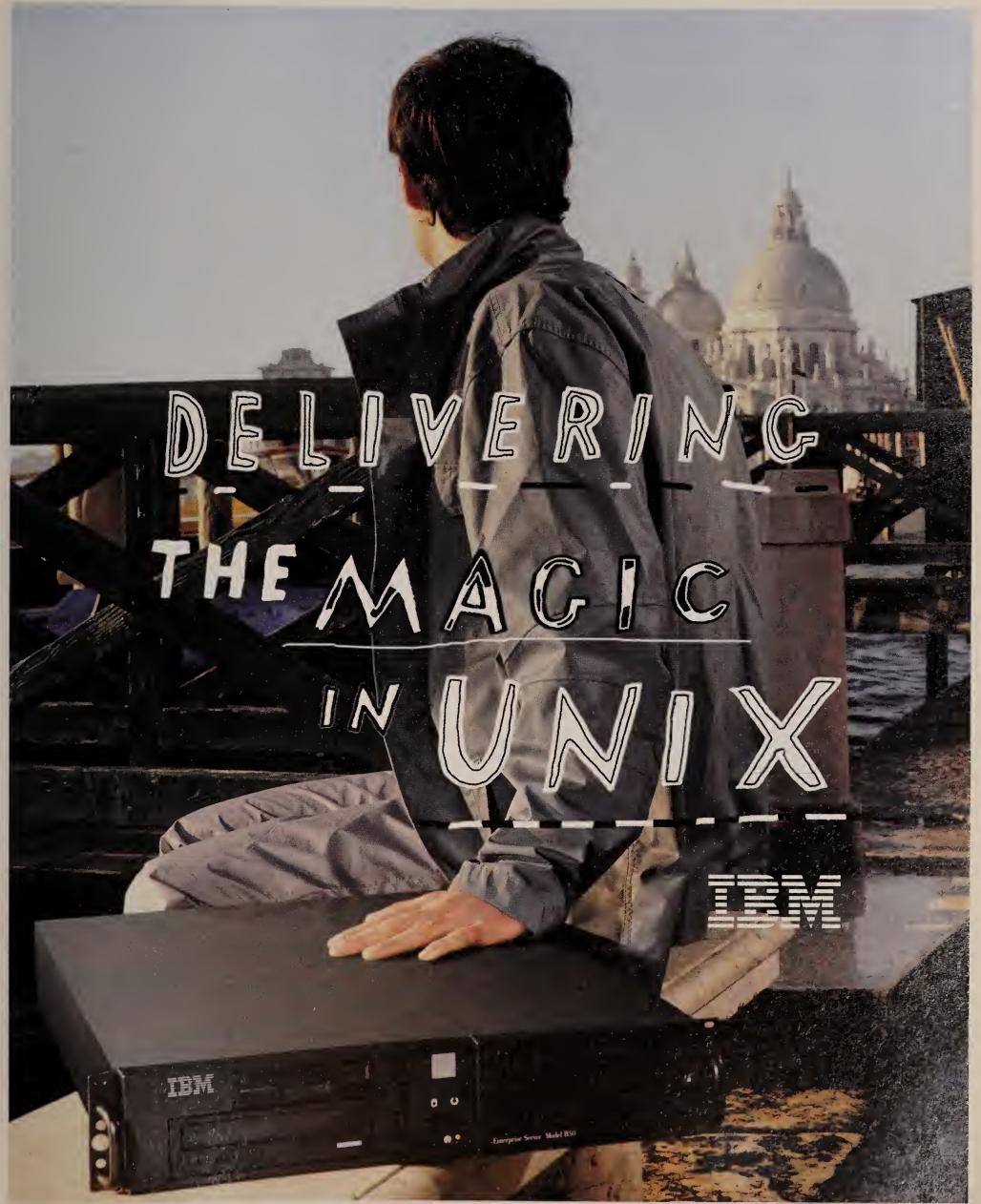> *Like surfing, catching a technology wave is an acquired skill.*

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IBM

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After-Hours Trading

BY LEE COPELAND

THE NEW YORK Stock Exchange Inc. (NYSE), Nasdaq Stock Market Inc. and American Stock Exchange Inc. (AMEX) are the indisputable leaders of the U.S. stock market.

But while these three markets attract the bulk of buyers and sellers, they miss out on some trades because they close promptly at 4 p.m. Eastern time Monday through Friday. Demand to execute stock trades may continue after the major markets close and into the wee hours of the morning. To meet this demand, a number of electronic communications networks (ECN) that accommodate after-hours trading have sprung up.

There are nine ECNs, including New York-based Instinet Corp., The Island ECN Inc. and MarketXT Inc., which serve as private alternative stock markets for institutional investors and brokerages. Individuals can't purchase stock directly through an ECN; purchases must be made through traditional stock brokers that partner with ECNs. Most ECNs take trades in the early morning for before-hours trading, until 8 p.m. Eastern time, and a few offer trades 24 hours a day.

Keeping Pace With the Market

Unlike the major public markets, ECNs offer the advantage of directly matching buyers and sellers, thus eliminating the spread — the per-share fee that market makers and brokers charge for executing trades. Despite avoiding the spread, which can range from 6 to 25 cents per share, the amount investors save by trading through ECNs can be minimal, because buyers and sellers still pay commission-based fees.

"People need to realize that they're still being charged a small percentage of money to trade after hours because [brokers] work on a small commission schedule," says Dan Burke, an analyst at Gomez Advisors Inc. in Lincoln, Mass. "Unless you're a day trader,

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DEFINITION

After-hours trading refers to the purchase and sale of publicly traded stocks after the major stock markets, such as the New York Stock Exchange, Nasdaq Stock Market and American Stock Exchange, close at 4 p.m. Eastern time. A slew of alternative private markets, called electronic communications networks, have emerged to accommodate after-hours stock trading. They are generally open until 8 p.m. Eastern time during the business week, but some stay open 24 hours a day.

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you have to go through a broker to access an ECN."

The biggest advantages to after-hours trading are that it accommodates traders in regions outside of the Eastern U.S. — especially international investors — and capitalizes on early or late-breaking news from an issuer. Much of that news, say analysts, relates to earnings, partnerships and other material announcements from Silicon Valley technology firms traded on the Nasdaq Stock Market.

"What has given rise to after-hours trading [are] private, retail clients, particularly as relates to Nasdaq stocks and technology stocks on the West Coast," says Raphael Soifer, chairman of financial consulting firm Soifer Consulting LLC in Ridgewood, N.J. After-hours news in "one part of the country or world affects prices, so it concerns everyone else."

Low Volume a Problem

The biggest disadvantage to after-hours trading is lack of volume. Most institutional investors close up shop after the closing bell. Analysts say that until the after-hours market attracts significant volume and meaningful price movements, the majority of investors will continue to make their trades during East Coast hours.

"The real issue with after-hours trading is the shortage of end users — buyers and sellers — relative to what exists during normal market hours," says Soifer. "The average institutional investor trades in $10 million blocks, but the after-hour market won't accommodate those large blocks, so it's not of interest to them yet."

"It's a chicken-and-the-egg conundrum," adds Larry Tabb, an analyst at TowerGroup in Needham, Mass. "There are not enough participants in the aftermarket to justify the expense of having [traders and brokers] working after the

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market closes, and there isn't enough volume generated to attract the big investors."

Hurdles to Overcome

Because of low trading volume or lack of liquidity, it takes much longer to find buyers and sellers in the after-hours market.

"The ECN market is fragmented. During the day, all transactions [are] run into a central exchange like NYSE, Nasdaq or AMEX," explains Tabb. "In the after-hours market, they are not. Bids outstanding on one ECN don't see each other because the after-markets are not connected."

Both NYSE and the National Association of Securities Dealers Inc. (NASD), the parent organization of Nasdaq and AMEX, plan to go public by year's end. Along with the cash bounty that an initial public offering will undoubtedly yield, there will also be pressure to better meet the demands of investors in the form of expanded trading hours.

Nasdaq now accepts quotes from its market makers until 6:15 p.m. Eastern time under a pilot program. "So far, things have been rather insignificant," says NASD spokesman Wayne Lee. Later this year, the Washington-based company plans to explore extending its trading hours further.

However, "there's still a lot of things that need to be worked out," contends Jennifer Schmidt, an analyst at Meridien Research Inc. in Newton, Mass. "Longer hours helps in the U.S., but not for overseas traders. If the market is extended for a few hours, I'm not sure how much that gives someone in Japan time to conduct trades."

"NYSE and NASD will do after-hours trading, it's just a question of when," says Jaime Punishill, an analyst at Forrester Research Inc. in Cambridge, Mass. "They have a lot of projects before them right now, like decimalization, and technologically, they're all behind the online trading firms. After-hours trading will not be that simple to execute, but they can't afford to wait." ❯

ECNs: Fragmented Markets

To increase liquidity in the after-hours markets, many of the major ECNs have agreed to share quotations.

By sharing bids to buy and sell issues, the nine existing ECNs hope to create enough volume to attract large institutional investors and compete more effectively as one virtual market, say analysts.

"If the ECNs all connect, then you'll have fragmented pools of liquidity that search each other for trades," explains Jaime Punishill, an analyst at Forrester Research. "At the end of the day, it's still a big pile of liquidity, and as far as the market is concerned, it does not matter whether it's made up of several networks or not."

Until volume develops in the after-hours market, some analysts plan to avoid it altogether.

"For the individual investor, it's difficult to get a de-

cent trade on a timely basis in after-hours," says analyst Steve Shepich at Olde Discount Corp. in Detroit.

It's almost impossible to gauge the fair price for an issue after the market closes, according to Shepich.

"When a company misses its numbers by 10 cents, what is the fair price based on that new information?" says Shepich. "The stock will move based on supply and demand, and that's hard to estimate in the after-hours market."

"The skinny on after-hours trading is that it's the first inning of a long game," says analyst Dan Burke at Gomez Advisors. "The liquidity levels and fragmentation concerns need to be worked out before there is wide-scale user acceptance."

– Lee Copeland

Showing the Value of

BY KATHLEEN MELYMUKA

SKANDIA AFS IN Stockholm didn't jump into the world of intangible asset reporting; it was pushed. In the early '90s, the venerable insurance and financial services company was heavily invested in real estate when the collapse of the Swedish real estate market shook the company's asset column. "Skandia had all these liabilities [insurance contracts], and its assets [land] were going down, so analysts thought we were in trouble," recalls Scott Hawkins, director of intellectual capital communication and development at Skandia USA in Shelton, Conn.

"We had incredible assets in our people, our customers and our processes, and the future looked very good, but traditional ways of reporting didn't enable us to fully tell that story," he says. "We needed a way to explain that we had a lot more value than just real estate."

Like many companies in today's economy, much of Skandia's value was intangible. Its products were insurance contracts — agreements. Its business model was built around managing relationships. "But can you show me a warehouse full of relationships?" Hawkins asks.

A good question in 1992, and an even better one in today's knowledge-based, high-tech, e-commerce world, where the Securities and Exchange Commission and the Big Five accounting firms are among those struggling to develop reporting frameworks that can properly value what's really happening in the new economy.

Clearly, traditional accounting methods can't do the job. Baruch Lev, a Philip Bardes Professor of Accounting and Finance at New York University's Stern School of Business, points out that the market value of the Standard & Poor's 500 averages six times the net asset value on the companies' balance sheets, meaning that traditional accounting methods are measuring only about 15% of companies' value.

A lot of that value is in technology. Lev points to AMR Corp., whose shares of its information technology arm, Sabre Inc. in Fort Worth, Texas, constitute half the value of the entire company because of the intangible value of Sabre's reservations technology.

And the new e-commerce companies don't even pretend to play to the bottom line. "E-commerce companies are not valued in the traditional way because they're not making money," says David Phillips, European leader of value reporting at PricewaterhouseCoopers in London. "They are building brand and customer loyalty, building the franchise. The investment community is putting value on a concept" — an intangible, he says.

IT plays two parts in this drama: It generates a lot of intangible value in companies and provides the tools that enable companies to measure that value for the first time. "A broader ability to measure for less cost is leading to a broader perspective" about what constitutes value, says Chris Meyer, director of the Ernst & Young Center for Business Innovation in Cambridge, Mass. "Skandia is a pioneer in recognizing that and attempting

SCOTT HAWKINS of Skandia USA says his parent company's measurement of intellectual capital has demonstrated the value of its processes, workforce and customer relationships

TRACEY KROLL

BRAINPOW

to do something about it."

Specifically, Skandia has focused IT tools on one area of intangible value — intellectual capital (IC) — and begun to measure, manage and report its findings to investors.

PIONEERING INTANGIBLES

Skandia began reporting on IC in a supplement to its 1993 annual report. The company defines IC as the sum of human capital (such as employee competence, relationship ability and values) and structural capital (such as software, databases, customer lists, manuals and trademarks).

Most companies try to highlight their IC in the management narratives that lead off their annual reports. But Skandia's reporting goes beyond that in two ways: It quantifies IC and looks forward, reporting on factors that indicate how likely the company is to reach its strategic goals.

These measures (see chart) are presented numerically and compared with those of previous years to show how Skandia's IC value is trending.

THE METHODOLOGY

But how does a company determine what to measure? Skandia ties IC reporting directly to its strategic planning process, thus measuring only the IC that supports strategic goals.

During the strategic planning cycle, the IC staff facilitates meetings of workgroups to consider strategic goals and the success factors necessary to achieve them. Then they focus on five areas modeled on the "balanced scorecard" approach popularized by Robert S. Kaplan and David Norton [Business, Jan. 24] — renewal and development, employees, customers, processes and finance — and decide how they can build toward success in each area.

Recently, for example, Hawkins met with call center managers. Initially, they told him that they measure their success by comparing the number of calls, queue time, abandonment rate

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Skandia Assurance and Financial Services (AFS)

BUSINESS: FINANCIAL SERVICES

HEADQUARTERS: STOCKHOLM

ORGANIZATION: 26 COMPANIES IN 20 COUNTRIES

EMPLOYEES: 6,000

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and processing mistakes with their numeric goals in those areas.

But Hawkins points out that those measures tell only part of the story. "Those are indicators of how well they're handling their processes," he says. "But what about their customers and their own people?"

He encourages managers to consider how people and customer value can be used to measure progress toward those goals. For example, a strategic goal might be more creative thinking, and one of the factors to achieve that goal is increased diversity in the workforce. The group looks for indicators — such as number of women and minorities in their unit — that the company is building those success factors. "It can take a few meetings to lead them through how to identify these," Hawkins says. But it's worth it because these choices are "rooted in our understanding of [what's] important to us."

The first of these facilitated sessions took place at the division level to get top management on board and produce the first IC report. The IC staff is currently facilitating sessions throughout the company, with a goal of eventually reaching every workgroup and all 6,000 employees worldwide.

THE TOOLS

As Skandia began to work through this process, it became apparent that it would need better IT tools than the quick-and-dirty Microsoft Excel spreadsheets it had used for the first IC supplement.

The early Excel spreadsheets evolved into a much more elegant, PC-based intranet system for collecting, organizing and reporting IC data. Called the Dolphin Navigator, it was created by the corporate IT group in Sweden and launched in October 1998.

Dolphin focuses on the connection between strategic objectives and key indicators within the five focus areas: renewal and development, customers, people, process and financials. Dolphin specifies long-term objectives, identifies critical success factors and activities that will achieve those factors and measures progress.

Dolphin is designed to show a top-level corporate overview of IC measures among the 24 operating groups around the world. Then it drills down

to the division view, departments, workgroups and even individuals. "It allows you to input results so you can see how you're doing over time," Hawkins says. "And when you're ready to report [to the outside], you've got the data. Over the next few years, we want to integrate that all the way down."

Skandia is a highly decentralized company, and its international operations enjoy a lot of independence, so while certain fields in Dolphin define mandatory measures, others are left to the discretion of the operating company, division or department, as determined during their meetings with the IC group.

Hawkins stresses that it's important to give worldwide operations as much freedom as possible to determine what they'll measure. "It's important to be sensitive to cultural differences," he says. For example, while the U.S. office measures the number of women managers, that concept would be foreign in some cultures. "If you were to mandate that and they tried to live up to it, it could severely impact their ability to do business," he explains. "So you have to say, 'Company B knows what's best for itself.' We try to allow the maximum flexibility for each company, unit and individual."

BENEFITS

Dolphin allows Skandia to collect IC data not only for reporting purposes, but also to manage IC better. "The reporting is a work in progress, but for the long-term development of the company, we feel it's more important that you manage the intangible assets," says Hawkins.

For example, the current high-level view shows certain patterns among Skandia's worldwide operations: Young companies just building their business focus their efforts on customer value. After four to eight years, there's a drop in customer focus and an increase in concern over getting the right people and processes in place to handle success. As the business continues to age, product lines near the end of their life cycles and the focus shifts to development and renewal.

Knowing this, Skandia can predict the kinds of concerns its operations will grapple with during any given stage of their development, and it can share best practices from others who have been there.

Another unexpected benefit of IC reporting has been that as employees go through the process of defining what they'll measure, they become more closely in tune with the company's strategic goals. "As they go through this process, they begin to understand why they're in the organization, what their function is, how they contribute to the company. They begin to align themselves," Hawkins says. "If

you get people aligned and understanding the business, you will have a more productive business."

Evidently. Skandia's stock has climbed steadily since the asset crisis of a decade ago. Hawkins stresses that the company's success is attributable to many activities and initiatives, but it's clear that by tackling IC head on, Skandia has turned a financial calamity into an image victory. "Today, Skandia can be described as an innovative growth company rather than a traditional insurance company," President and CEO Lars-Eric Peterson says in a recent IC report. "Through measurement tools and continued work on developing and applying new work methods, competencies and value-creating processes, we are making invisible capital visible." ▶

What to Measure?

Here are some examples of IC measures from Skandia's current high-level view of its operating companies worldwide:

CUSTOMER FOCUS:
- Market share (number of accounts)
- Customers lost
- Fund assets per customer
- Satisfied-customer index
- Number of contracts
- Number of fund managers
- Number of funds

HUMAN FOCUS:
- Employee turnover
- Average years of service
- Gender
- Age
- Education
- Number of women in management
- Empowerment index
- Change in company's IT literacy

RENEWAL AND DEVELOPMENT:
- Competency development expense per employee
- Marketing expense as a percentage of managed assets
- Marketing expense per customer
- IT spending
- Training expense per employee
- Premium from new launches
- Increase in net premium

PROCESS:
- Outpayment processing time
- Percentage of applications filed without error
- PCs per employee
- Laptops per employee
- Administrative expense per employee
- IT expense per employee
- Contracts per employee
- Processing time on contracts

the best &worst

career moves

WHETHER YOU HANG OUT your own shingle or join an established firm, you can reap many financial and personal rewards as an IT consultant.

Increasingly, companies are tapping outside experts for high-profile information technology projects. Many companies find it economically unjustifiable to keep a full stable of permanent IT specialists, particularly if their core business has nothing to do with IT. And most don't want to be regularly laying off internal IT personnel after big projects are completed.

Besides, even if companies wanted to avoid outsourcing, most IT managers say there just aren't enough IT resources to go around. For these reasons, worldwide spending on outsourcing topped $99 billion in 1998, according to International Data Corp. (IDC) in Framingham, Mass., and well over half of that was spent by U.S. organizations.

IDC expects outsourcing expenditures to explode to more than $151 billion by 2003. "To remain competitive, many companies outsource as a way to reduce costs, increase efficiencies and refocus critical resources," says IDC analyst Cynthia Murphy.

For IT professionals who believe that variety is the spice of life, following the consulting path represents a continuum of new beginnings and fresh exposure to different cultures, business challenges and the latest technologies. To help those considering consulting, *Computerworld* asked several consultants to share anecdotes and offer advice about career moves that paid big dividends, as well as a few that backfired.

To assure success, veteran consultants recommend that you learn humility, get comfortable with diplomatically speaking your mind and above all, never stop honing your listening skills.

Note that becoming an expert in any particular technology isn't on the list. As more than one consultant noted: "Projects don't fail because of technology. They fail because of relationships."

all the **right** moves

Those who have gone the consulting route say they feel that they have an opportunity to work on the most exciting part of an IT project — planning, development and implementation — and that they get to circumvent much of the drudgery of ongoing daily systems maintenance.

By plan or by chance, consultants

ILLUSTRATIONS DAN BAXTER

Industry veterans offer their personal lists of do's and don'ts for building a successful career as an IT consultant. By Joanie Wexler

BUSINESSCONSULTING

have found that certain experiences and attitudes have been invaluable to them in building successful careers.

Gain intimate knowledge about business process

Getting hands-on business experience as an auditor can pay off enormously. Starting here builds insight as to how technology can be applied to successfully support and advance a business.

Allan Frank, a 20-year consulting veteran and founder of AnswerThink Consulting Group in Miami, for example, launched his career in the accounting and finance area. He received a bachelor of science degree in accounting and later earned an MBA in finance and a master's degree in computer science. He spent the first year of his career as an auditor at the then-Big Eight accounting firm Arthur Young, rotating among a diverse set of companies that spanned many vertical industries.

"This was the best thing I could have done," says Frank. He explains that being an auditor requires becoming intimately familiar with the workflow of a business, which translates into understanding how to leverage IT to support the organization. "You follow a piece of paper, such as an order, from beginning to end and see where it goes and the separation of duties among everyone involved along the way. This provides fundamental grounding in business function — which is absolutely necessary for understanding how to support these processes with automation and technology."

Transition into self-employment slowly

Finding himself the victim of a merger ultimately proved fruitful for Al Schulman, now a vice president at TKO Systems, an IT consulting and professional recruitment firm in Atlanta. Schulman had spent 11 years in the IT department at a bank and was in the midst of running a $20 million branch office automation project when the bank was suddenly sold and the project abandoned.

Schulman, who had long considered consulting an unstable IT career alternative, says he realized that job security, in general, was no longer a pre-

dictable commodity in the business climate of the '90s.

"I thought I was in the bosom of the company," says Schulman, who co-founded TKO Systems three years ago. "Suddenly, I was the new guy on the block with no control over important company decisions — or the direction my career was taking."

Generally risk-averse and a creature of habit — "I wanted to know where I was going to park every day" — Schulman transitioned slowly into becoming an independent consultant. He spent six months as a contractor, procuring a temporary position through an agency. From there, he moved on to becoming a full-time staff consultant at a professional services firm that followed the model of assigning consultants to client projects and paying their salaries even when workers were "on the bench."

After 18 months in that environment, "my emotional state was ready" to go it alone, Schulman says. "Now I'm in control of my career again."

The bottom line, according to Schulman, is that if you are by nature risk-averse, you don't need to jump from the frying pan into the fire. You can test the consulting waters in various capacities and see which works for you. He says he was surprised to find himself in business for himself — but getting there incrementally allowed him to do it.

Going the independent route, Schulman says, gives him the most control over his employment destiny.

Aspire to be bought out

From a financial perspective, starting your own shop can be particularly lucrative if you can build an impressive clientele and get scooped up by a bigger firm.

For example, in 1981, David Passmore, a founder of and now research director at NetReference Inc., a Sterling, Va.-based firm focused on network architectures, started a consulting firm called Network Strategies. The firm was later purchased by Ernst & Young LLP.

Passmore woke up one day to find his "status in life raised" as a very young partner in the then-Big Six firm. "This was one of the coolest moments of my career," says Passmore.

After four years, Passmore decided he preferred being part of a smaller enterprise and went back into business for himself. "While the Big Six experience was invaluable, ultimately, you start taking orders from the audit-

ing and tax people, which can be less rewarding," says Passmore. Also, at such firms, you and your immediate family are precluded from holding stock in any company that is a client, he says.

"That rules out a ton of firms," says Passmore. He explains that his wife was working at a company that happened to be a client, and she couldn't even exercise the stock options that were part of her personal benefits package.

all the **wrong** moves

Most consultants say they learn from adversity, so even bad experiences and mistakes pay dividends down the road. However, they advise avoiding the following pitfalls:

Signing noncompete agreements

When joining a professional services firm, read the fine print of your contract carefully. If you think that you may want to move on to running your own business, make sure you check out any noncompete clauses with a lawyer.

Quite often, firms have consultants sign these agreements, which preclude them from working in the business at all for a year or more after leaving the firm. The goal is to protect the employer from losing clients to the departing consultant.

"Those clauses leave you the option to basically mow lawns and paint houses for a year," says one consultant.

Some employers and even attorneys dismiss these clauses as unenforceable or just boilerplate, but some consultants say you should simply refuse to sign them, even if it means you must seek opportunities elsewhere.

"If you get sued, you automatically lose, regardless of who was right, who was wrong or what happened," notes one consultant, who requested anonymity. He says he had to spend six figures to settle because he couldn't afford the three years it was going to take for his case to go to court.

Tattling on internal employees

Another consultant was once asked by a senior manager at a client company to comment on an internal employee's performance and behavior. The consultant, who asked not to be identified, says his automatic reaction

was to comply and be "brutally honest."

"Looking back, I think I would have just kept my mouth shut," he says. His comments got back to the employee, who eventually wound up in charge of hiring consultants.

The consultant says it's the client's responsibility to evaluate the performance of internal staff and, since you can never be sure what gets back to whom, you could potentially burn a bridge for the future.

On the other side of the coin, Carol Anne Ogdin, a 20-year consultant and founder and president of Deep Woods Technology Inc. in Santa Clara, Calif., says it really paid off early in her career when she asked to be included in the internal IT team's performance review process. She says her client was thunderstruck that she would want to set herself up for potential criticism, when it wasn't a requirement for consultants to participate in performance reviews. "But how else was I going to know if I was doing a good job?" says Ogdin.

The strategy seemed to backfire at first. "I was livid for three days afterward," she says, because her review wasn't stellar. But it made her realize how important the communication of expectations was to her success, and she has carried the experience — and the practice of getting reviewed — with her.

"Yes"-ing a client to death

Clients generally already have plenty of nodding heads around and often look to consultants to provide a fresh perspective. It is also politically easier for a consultant to stir things up than internal employees who have to survive indefinitely in the corporate culture.

NetReference's Passmore says it's easy for consultants to get the derogatory reputation as "people who borrow your watch to tell you what time it is. But what companies are really paying you for is an outside, unbiased view."

Ogdin agrees. "You can maintain a rapport without being disagreeable," Ogdin says. "Diplomacy is the art of telling somebody to go to hell in such a way that they look forward to the trip." ▶

Wexler is a freelance writer and editor in Campbell, Calif. She can be reached at joanie@ jwexler.com.

Some people have innate talents for managing projects. Here's how to recognize them.
By Kathleen Melymuka

YOU CAN TRAIN somebody to be a good project manager, but great project managers seem to be born, not made. Excellence depends on certain innate characteristics: Some of us got 'em, and some of us don't.

"Project management requires competencies in three subject areas: technology, business and behavior," says Linda Pittinger, CEO of People³, a human resources consultancy in Somerset, N.J. Ideally, project managers should have all three, she says, but if you had to choose only one to focus on, it should be behavior. "People can go to school to learn the technical things, and they can learn the business over time," she says. "The behavioral competencies are the ones people are least able to learn. They're intuitive."

Recognizing who in your workforce exhibits these behaviors will help you identify people who are predisposed to success as project managers.

BORN
TO LEAD PROJECTS

▶ **CHEMISTRY** Determining whether someone knows C++ is easy. Figuring out whether he has the right personality to be a great project manager is trickier.

"Project management is a chemistry job," says David Foote, a managing partner at Foote Partners LLC in New Canaan, Conn. "It requires all these soft skills that have to do with getting things that you want [and] adjudicating issues between people, managers, egos and agendas. It's how to get a job done without annoying people."

"The ability to deal with people will make or break a project manager," echoes Kevin McGuire, who has been a project management consultant for nine years as director of services at Primavera Systems Inc. in Bala Cynwyd, Pa.
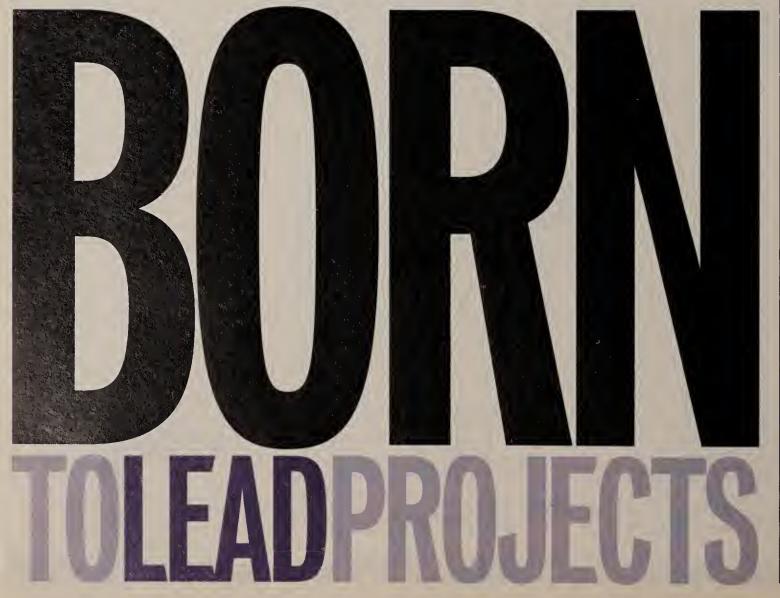
But that doesn't mean that great project managers have to be huggy bears. "I divide them into the 'touchy-feelies' and the 'let's-get-down-to-business' people," says Johanna Rothman, president of Rothman Consulting Group Inc. in Arlington, Mass. She has 18 years of project management experience and teaches the subject at The Gordon Institute at Tufts University in Medford, Mass.

▶ **WHERE TO LOOK** If you're looking to spot potentially great project managers, you might start at a company softball game or picnic. "I always look for people who organize social activities — ski trips, big group luncheons. That demonstrates an ability to get a group of people moving toward a common goal," says Nancy Johnson, who worked in corporate project management for 20 years. She is now an assistant professor of MIS in the College of Management at Metropolitan State University in Minneapolis.

▶ **COMMUNICATION** Strong leadership requires strong communication skills — not oratory, but the ability to connect. "You want someone with the ability to bring people together," Pittinger says.

Great project managers find a way to share their vision with everyone. "With some people, they do it with just words," Rothman says. "With some, they have to paint a picture of how it's going to feel. [Others] have to explain each of the pieces, but they want to get people in the groove with them."

They also have an intuitive under-

standing of where people are coming from, says Johnson, and it's easy to spot. "When I explain something to them, I only have to start explaining the first two steps and they intuitively know the next steps," she says.

Another key aspect of communication is getting people to respond to you. "They have to be good at drawing the best out of their people," says Jim Oswald, a project manager with 20 years' experience who does project management consulting as vice president of professional services at Project Management Solutions Inc. in Philadelphia.

And that, says Rothman, requires faith. "Project managers really believe that people want to do a good job and they want to help," she says. "They don't take mistakes personally; they don't think people are out to screw them."

Good communication requires good listening skills. "Look for very effective and active listeners," says Oswald. "Project managers have to be able to hear what people are saying."

The ability to see things from another person's perspective is extremely valuable, says Bill Berghel, a project manager at FedEx Corp. in Memphis. He looks for "somebody who can restate each person's view to his satisfaction."

Effective project communication also requires an ability to get beneath the surface when the whole truth may not be apparent. "A certain radar tells you when people are being completely open and honest with you," says Dennis Johnson, an assistant vice president at USAA, a San Antonio-based insurance company. "A project manager needs the ability to question without alienating — to listen and watch people's body language and really see what's happening."

For example, says Johnson, who has developed that ability during his 25 years in project management, "someone will be nodding his head as if he understands, and I know he'll go back and say, 'What did he really want?' Then someone else will ask questions that show he's trying to get to the next level and truly internalize this stuff. I can see it in his eyes. You need that radar."

"It's important to draw information out," Berghel adds. And that can require courage. "This is the person who will ask an executive a question and everyone else in the room will gasp," he says. "They have to have the courage to ask the questions that need to be asked, even if they think it might look silly," because these are the questions that can make or break a project. (Think, for example, of the stupid question no NASA project manager asked about the Mars Polar Lander project: "Are we talking miles or kilometers here?")

Finally, says McGuire, that communications mix includes a touch of salesmanship. "You need people who can evangelize — act almost like salespeople for their projects," he says. "You have to sell the value of your project to upper management [and] make sure it's visible, and then you have a better chance of getting what you need when you need it."

▶ **PERSUASION** A corollary of communications skills and a hallmark of great project managers is their ability to influence others over whom they have no authority. "In IT organizations, the project manager often is responsible for delivery of product but doesn't have authority over resources," McGuire says. "They're vying for resources with everyone else in the organization."

"It's hard to find people who can influence others and create win-win situations," Pittinger says. "Your customer says they need it in 60 days, and you know 120 is a stretch. How do you influence that person who could totally ruin your career? That's the project manager I want to hire."

A by-product of this skill is the ability to build and sustain collaborative relationships. They're critical because project managers often need to work with people throughout the company and outside of it. "Look for people who build bridges instead of walls," McGuire says.

▶ **GENEROSITY** Great project managers share the credit and take the blame. "Look for someone who gives credit to others — who doesn't talk about 'I' but about what 'we' as a team did," Nancy Johnson says.

"Look for a person who doesn't need the whole world revolving around him or her," she continues. For example, notice people who share their knowledge and skills to empower others.

That same generosity makes great project managers approachable. "It's not

WHEN FEDEX CORP.'S BILL BERGHEL looks for a potential project manager, he looks for someone who can see a situation from another person's perspective

necessarily someone you want to have a beer with but someone you're not afraid to talk to," Rothman says. "They don't blame people when they screw up. They find out why and then say, 'Where do we go from here?' "

▶ **VISION** Great project managers also have vision. They look for patterns and understand cause and effect. This is easy to spot, Rothman says, because they talk about what has worked, what hasn't and why.

This kind of thinking leads to foresight. "A successful project manager often knows what is going to happen in a project from the beginning to the end," Berghel says, and that includes the risks. If you can ask whether it would be possible to deliver a certain project within a certain time frame, he says, some people will say "yes" and some will say "no." But a diamond in the rough will say, "Well, if you can get by problems A, B and C . . ."

Because they can see what's coming, great project managers are natural contingency planners. "A good project manager assumes the worst," says Nancy Johnson. "They think about, 'If this happens, what do I do?' "

▶ **FLEXIBILITY** Great project managers bend their own roles to accomplish a goal. "You want a facilitator," Rothman says, "leading from the front, standing in the middle and pushing from the back. They change places depending on who they're with and what they need."

▶ **HUMOR** Given the crazy world they work in, great project managers need a good sense of humor. "So much wacky stuff can happen in a project that sometimes all you can do is laugh about it and move on," Berghel says.

▶ **NO SWEAT** Though you might be tempted to draft the guy who used to keep 15 plates spinning simultaneously on *The Ed Sullivan Show*, he's the one who will perpetuate a project-crisis mentality. Instead, check out the guy kicking back with a cup of coffee and his feet on the desk. "Look for a person who's like a duck," says Nancy Johnson. "On the surface of the water, it's very placid. Underneath, they're paddling like hell."

"The really great project managers look like they're not doing anything," Rothman agrees. "They do some stuff that doesn't look like work to other people: They actually think." ▶

THE WRONG STUFF *It's important to look for what would make a great project manager, but you should also seek subtle tip-offs that tell you a person is wrong for the job. Nancy Johnson offers some red flags that may indicate a person has the "wrong stuff."*

- **The superhero:** No one can do this except him.
- **The cleaner:** Really enjoys cleaning up messes, often of his own creation.
- **The overoptimist:** Always on the verge of nirvana, but somehow the darn compiler always gets in the way.
- **The finger-pointer:** Deflects the blame, accepts the glory.
- **The foxhole bonder:** Lives on pizza and sleeps on the office floor for 72 days straight, but – by God - he's part of a team!
- **The firefighter:** More interested in putting out fires than keeping them from starting in the first place.
- **The martyr:** Gains self-worth through suffering.

There Are Projects — and There Are *Internet* Projects

Author and consultant **Jim Highsmith** *has been looking at project management in Internet environments and he says it's a different species. He says a traditional project is planned, disciplined and measured, while an Internet project is improvised, creative and evolutionary. As a result, the Internet project manager is a different animal altogether, Highsmith tells* Computerworld's Kathleen Melymuka *in this interview.*

Why do we need to talk about Internet project management separately? I differentiate between traditional projects, which are very complicated, and new-style projects, which I characterize as complex: high speed, high change and high uncertainty.

High uncertainty? We don't know exactly where we're going, but we know we have to get there quickly, and we know things will change a lot.

And different skills are needed for these different types of projects? Traditional projects are characterized by optimizing. They're well planned, have strict processes and can be measured. They grew up in a command/control culture. The complex project world is more adaptive. You have to learn how to be flexible, how to improvise — and you can't get too hung up on measurements and process.

So a good traditional project manager might not do well in a complex project? In terms of basic personality types, there are people who go toward one side or the other. Some like things planned, they like to work within a fairly rigorous structure, they like to know what they'll be doing tomorrow, and there's a whole set of project management skills and abilities built around that. A whole other set is built around being more adaptive.

What are the characteristics of people who would be likely to succeed in Internet projects? They have the ability to collaborate, to facilitate group interaction toward some goal. They aren't so

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LANCE CLAYTON

WHO IS HE?

Jim Highsmith is a senior consultant at Cutter Consortium in Arlington, Mass., and author of *Adaptive Software Development: A Collaborative Approach to Managing Complex Systems* (Dorset House, 2000).

much task-oriented as they're able to say, "We have a goal, and somehow we have to solve this problem to come up with what we've got to do." Facilitation is more important, because they can't tell each person in the group what to do because they don't know what to do. They have agility and improvisational skills — as in a jazz band. They need the ability to improvise, change direction a little bit, but

keeping basic fundamentals of values and mission — just as a jazz band improvises around a few basic rules.

What sorts of fundamentals? They have to have some idea of the direction and the business goals for the project, even though they don't know exactly what the project will turn out to be. It's more of a direction and a set of boundaries and constraints, as

opposed to a plan that says specifically what they'll do.

Any other important traits? The ability to let go — to truly delegate a decision framework to somebody else. It's hard enough to empower employees in the next cube, but to empower somebody halfway around the world as part of your team takes a leap of faith.

Why can't the project manager just make the decisions? You can do that with six or eight people, but how do you do that in a large project team of several hundred people across time and space? Those are the kinds of challenges we have to face in the Internet era.

How do you identify a person who can do that? The skill is more influencing than controlling — influencing what's going on because you don't have the same control you used to have. The basic trait is the ability to say, "I don't have to be in control!" in the traditional sense of making the decision. Just because you lay out a project plan doesn't mean we can actually *do* that. In the traditional world, which was slower, we could actually control things. In this new world, we aren't in control.

So what happens to a traditional project manager in an Internet-style project? A traditional project manager might go nuts, and the people who have been working for a traditional project manager might, too. They come and say, "What do I do next?" They want a task list. Here, all they have is an end goal and they go nuts.

It sounds like the old project manager was a craftsman and this new kind is an artist. Well, managing in this environment is much more difficult. It's more about creating the right kind of environment than creating a task list. You have to have an innate belief that creating the right environment will create results, even though you don't know how to get where you're going.

And I'll bet creating that environment isn't easy. You have to hold a creative tension, and that's an uncomfortable place for a lot of people to be. It's hard for the project manager because you don't want the group to be comatose and you don't want them to be psychotic. Creative tension is in the middle, and it's a fairly narrow place. It's the zone where you work together well, create good ideas, innovate. But the optimizing tendencies of traditional project managers can, if taken too far, destroy that kind of environment. ▶

DR. SHAHLA BUTLER | IT LEADER

VP, Director AMS Center for Advanced Technologies,
a job most of us would die for.

IT LEADERSHIP is about using every opportunity—every technology—to reinforce your company's purpose. It's about defining business imperatives and driving the acquisition of the right technology. But the daily demands of running a company and an IT infrastructure don't always allow the time to get up to speed on the latest innovations.

As Director of the AMS Center for Advanced Technologies, Dr. Butler's mission is to increase our understanding of emerging technologies. "Ours is a commitment to keeping AMS clients on the frontier of IT practice," she says. "To address technologies that will fundamentally change the business landscape."

YOU CALL THIS WORK?

MONTHS BEFORE MOST OF US SEE THE LATEST TECHNOLOGY, DR. BUTLER GETS A PEEK AT THE REALLY INTERESTING STUFF.

For example, her team's initial XML research yielded an intelligent agent that collects relevant information across multiple sources then synthesizes, categorizes and disseminates it based on a user's specified interests. "Our Next Generation Enterprise and Business Intelligence & Knowledge Management labs are collaborating now to evaluate emerging non-numeric mining tools," she proudly reports. "We'll be releasing the results soon."

And where does Dr. Butler gain her understanding of emerging technologies? From her peers, at conferences, from the Web and from *Computerworld*. The Newspaper for IT Leaders.

COMPUTERWORLD
THE NEWSPAPER FOR IT LEADERS

BUSINESS ADVICE

Dear Career Adviser:

I have five years' experience developing inventory and financial applications for AS/400s. Our new CIO is axing current staff to bring in people he's worked with before. I've been here two years, and in the past four months, he's fired three people and says he's not done. - WORRIED

Dear Worried:

To figure out how safe you are, "first assess whether the new CIO has been brought into the company to merge with or wipe out the current staff. You will then have a better idea of the new CIO's game plan," advises Miriam Erez, professor and former dean of the industrial engineering and management faculty at the Technion Israel Institute of Technology.

You can readily tell. If you were on the team invited to interview the new CIO prior to his arrival and if your skills are up to par, you might be safe. But if your company's market position is poor and its business results weak, or if this new CIO was brought in to transform your employer's current architecture and systems, then beware.

With more firings to come, don't fool yourself into trying to save your job; instead, figure out if you're marketable, build your current skill set and hustle to find new leads.

Unfortunately with this particular scenario, most people waste too much time trying to save their current job rather than understanding the end is near and seeking new work.

Dear Career Adviser:

I have 25 years of IT management and application development experience in the insurance industry, managing successful projects to develop and implement client/server applications. My skills include Oracle, DB2, Visual Basic and C++.

I've also directed development of business applications to support re-engineered business processes, utilizing joint application development methodologies and process and data modeling techniques.

I saw an opportunity for an international consulting job as a project manager for cus- tomer software for an online banking application. Can I interview and get this e-commerce project management job? - REALISTIC?

Dear Realistic:

"Clearly, developing an online application is different from developing a client/server application, not just from the technical side, but also from a business/marketing

FRAN QUITTEL is an expert in high-tech careers and recruitment. Send questions to her at www.computerworld.com/career_adviser.

side of the design," cautions Peter L. Cherpack, financial services practice leader at CoreTech Consulting Group Inc. in King of Prussia, Pa.

Your résumé vaguely refers to some online project management experience, which may persuade someone to conduct a phone interview with you. But you should do intense homework to at least sensibly "talk the talk" that will land you an e-commerce project management job.

Doug Benham, chief technology officer at Concentrex, an online banking software house in Trumbull, Conn., says, "First, you'll need to show you can build a project plan that shows you clearly understand the skill sets, technical knowledge and time lines needed for Internet development and are ready to staff accordingly.

"Then you must address at least essential basic concepts regarding Web technologies and protocols such as HTTP, [Secure Sockets Layer], HTML and JavaScript or firewalls and security, never mind hard-core issues related to session management, security and privacy, or the advantages and disadvantages of various Web application models such as [Common Gateway Interface], server-side plug-ins, and the template approaches," Benham says.

Unless you can stand up to in-depth conversation in those areas, you probably won't get the job.

Dear Career Adviser:

I have more than 10 years of voice and data telecommunications experience, which includes extensive Internet experience. Most of my career has been in large corporate environments. How do I market myself to a start-up? - SMALL COMPANY BOUND

Dear Bound:

Do your research at *www.sjmercury.com/svtech/companies/moneytree*, the venture capital site owned by the *San Jose Mercury News*, and at *www.venturewire.com* to see which companies might be good targets for your talent.

"Particularly with this tight labor market, in addition to seeking new companies to invest in, finding talent is the second major area of interest for venture capitalists," says R. D. Whitney, vice president of operations at Fitzwilliam, N.H.-based Kennedy Information LLC, which publishes the Gold Book of Venture Capital, a directory of venture firms and people.

Make no mistake: Many young companies won't want to hire you off your first bounce out of corporate America, because start-ups are an entirely different breed.

To conquer that hurdle, you should do some pro bono work with seed companies while you're pitching your corporate skills to the big guns to show that you can handle working at blurring Internet speed. ▶

BRIEFS

Keyword Technology Goes International

RealNames Corp., a San Carlos, Calif.-based maker of technology that substitutes simple keywords for complex Web addresses, is making its service available worldwide. A new subsidiary, called RealNames International Corp., will operate in Europe, South and Central America, Africa, Australia, Japan, Korea, Taiwan, China, Singapore and Hong Kong, the company said.

Microsoft Corp., which announced earlier this month that it's buying a 20% stake in RealNames, said it will use the keyword service in its portal sites around the world. The international service will let users in foreign countries navigate the Web using keywords in their native languages.

HVAC/R Industry Gets Marketplace

A new electronic marketplace was created last week for the heating, ventilation, air conditioning and refrigeration (HVAC/R) industry by eCaribou.com Inc., an HVAC/R Internet supply-chain management business in Memphis. The marketplace links buyers and sellers in a single site that allows HVAC/R service companies to compare and purchase parts from major manufacturers and suppliers. Initially, parts will be distributed from a central distribution center, but eCaribou.com announced plans to offer local availability this spring.

Teachers Sign Deal With Lawson

Teachers Insurance and Annuity Association-College Retirement Equities Fund (TIAA-CREF) last week inked a deal with St. Paul, Minn.-based Lawson Software. TIAA-CREF, the New York-based retirement system for education and research institutions, plans to use Lawson's human resources and payroll software.

"Lawson's comprehensive functionality and advanced Web technologies were key factors in their favor, along with the company's commitment to serving the financial services industry," said William Shanahan, vice president for human resources at TIAA-CREF. "We expect Lawson's self-service features to improve information flow among managers and associates nationwide."

German Consortium Launches Exchange

SAP AG announced last week that it's joining with a consortium of German chemical companies to develop an e-commerce business-to-business exchange for the chemical and pharmaceutical industries.

The joint venture, set up by SAP, BASF AG, Degussa-Huls AG, Henkel KGaA and Metallgesellschaft AG, is expected to be ready next month and will be open to companies around the world, SAP said in a statement.

New Member Joins ecFood Advisory Board

Business-to-business Internet marketplace ecFood.com in Santa Clara, Calif., has named Bill Friend to its new 14-member advisory board. As group vice president, Friend manages information systems for multinational agribusiness J. R. Simplot Co.'s Food Group in Boise, Idaho. EcFood.com is looking to the board to help establish and develop the site's strategic importance to the industrial sector of the food industry.

TECHNOLOGY

DATA IS KING

Tools for data storage and management top IT shopping lists this year, according to a *Computerworld* survey. Other purchasing priorities include replacing older desktop PCs, providing high-speed Internet access for telecommuters, implementing security and managing Web content. ▶ **82**

WINDOWS 2000

Purdue Pharma LP plans a migration to Windows 2000 early next year. But IT manager John Kronick says security issues, personnel shortages and the need to support sophisticated network capabilities in relatively primitive areas will make the migration a challenge. ▶ **73**

SECURITY JOURNAL

Week 3: "Pat" scores points by solving an easy security problem, makes valuable friends at his Internet service provider and dips his toe into the perilous waters of policy-making. ▶ **76**

QUICKSTUDY

Reviews editor Russell Kay offers a tutorial on authentication, or how your computer system, network or other protected resource knows you are who you say you are. ▶ **77**

WIRELESS E-MAIL

Although it's only a year old, the BlackBerry wireless e-mail service and terminal is already

providing benefits for corporate users ranging from brokerage houses to attorneys. ▶ **75**

EMERGING COMPANIES

Start-up Visionael's products can pinpoint the physical location of every device on a large network. That capability, says CEO Marc Jones, can save network administrators a lot of time and money, particularly if they're managing the wide-area network from multiple, distant locations. ▶ **84**

EXEC TECH

Biometric devices offer unforgeable security based on users' physical characteristics, such as fingerprints, voice qualities, signature dynamics and retinal patterns. They're more affordable and reliable than you may think. ▶ **78**

WHAT'S IN A LABEL?

Plenty, if the Multi-Protocol Label Switching Forum has its way. The group holds its first technical committee meetings next week in an attempt to bring speedier data-handling capabilities to the Internet. ▶ **72**
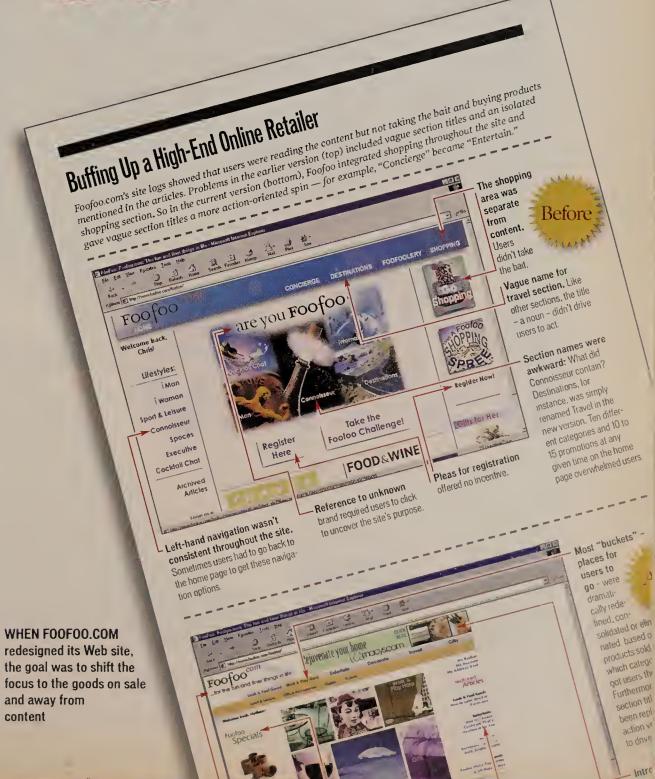
OUTSMARTED?

French smart card users were in an uproar last week after officials at a banking industry group revealed that a known algorithm could be used to create forged cards for transactions such as buying train tickets. ▶ **74**

ONLINE, IT'S THE GOODS, STUPID

CONTENT MAY BE KING, but for retail sites, it doesn't pay the bills. Online retail start-up Foofoo.com learned to surround its products with relevant content, rather than the other way around. It also learned the importance of building an architecture that makes change easy, because you'll always be reinventing yourself.

80

Buffing Up a High-End Online Retailer

Foofoo.com's site logs showed that users were reading the content but not taking the bait and buying products mentioned in the articles. Problems in the earlier version (top) included vague section titles and an isolated shopping section. So in the current version (bottom), Foofoo integrated shopping throughout the site and gave vague section titles a more action-oriented spin — for example, "Concierge" became "Entertain."

The shopping area was separate from content. Users didn't take the bait.

Vague name for travel section. Like other sections, the title – a noun – didn't drive users to act.

Section names were awkward: What did Connoisseur contain? Destinations, for instance, was simply renamed Travel in the new version. Ten different categories and 10 to 15 promotions at any given time on the home page overwhelmed users.

Reference to unknown brand required users to click to uncover the site's purpose.

Pleas for registration offered no incentive.

Left-hand navigation wasn't consistent throughout the site. Sometimes users had to go back to the home page to get these navigation options.

Most "buckets" – places for users to go – were dramatically redefined, consolidated or eliminated, based on products sold...

WHEN FOOFOO.COM redesigned its Web site, the goal was to shift the focus to the goods on sale and away from content

Java Gives a Jump-Start to Web-Based Applications

Products help users extend apps from the mainframe

BY JAIKUMAR VIJAYAN

JAVA TECHNOLOGIES are helping some companies take advantage of their existing mainframe applications and data to quickly deliver new Web-based services and applications, according to users.

Take Green Bay, Wis.-based Schneider National Inc., a private multibillion-dollar warehousing and logistics provider for the trucking industry.

Schneider used IBM's VisualAge for Java development environment, Lotus Development Corp.'s Domino Go Web server and IBM's WebSphere application development server for the OS/390 in developing an order capture system aimed at improving the company's ordering and tracking process.

The system provides a quick and easy way for more than 1,000 Schneider employees, business partners and suppliers to interact with mainframe-based services via browser-enabled clients, said Steve Matheys, vice president of applications development at Schneider.

Schneider is among the companies that claim to have successfully taken advantage of Java's standards-based development environment and cross-platform portability to add new applications and functionality to their OS/390 mainframe environments without any disruption to existing systems.

"From a technology perspective, we took a big risk" in trying to integrate Java's object-oriented development approach with a predominantly Cobol, CICS environment, Matheys said. "But it's a doable, deliverable thing."

For example, a truck driver trying to enter an order into the Schneider system can go to the company's Web site and gain access to a personal, customized portal site by keying in a user name and password.

A Java applet running in the browser generates an order entry form, which the driver fills out and sends over the Internet and through a firewall into a Domino Web server on a Schneider mainframe. From there, it goes to the firm's Websphere application server — the core Java runtime environment — which sends the request through a transaction gateway to an IBM CICS environment. A Cobol DB2 program invoked by CICS processes the request and sends it back to the driver.

Robust and Scalable

Schneider has built "a fairly robust and scalable client user interface" to work with the older mainframe environment, Matheys said.

An alternative to achieving the same sort of functionality would have involved converting all of the company's legacy code to C++ and supporting fat clients, Matheys said.

Speed of deployment was one of the primary reasons Towers Perrin used Java to create an intranet Web portal for more than 2,000 of its business consultants worldwide, said Ken Wilson, a project manager at the private billion-dollar New York-based management and human resources consulting company.

The portal provides consultants with continuous and reliable access to applications needed to respond to client queries, data requests and other transactions, Wilson said.

The three-tier application architecture incorporates a standard Web browser-based user interface on the desktop, middle-layer Web servers and a Java virtual machine on OS/390 that runs Java programs using a standard Java database connectivity interface to DB2 for OS/390.

No Tweaking Required

Using Java lets developers focus on optimizing the way data was presented to the consultants without really worrying about tweaking the underlying platform, Wilson said.

"We chose Java because getting the application developed quickly was one of our highest priorities," Wilson said. The project was started in October 1998 and went into production in June 1999.

"Our best estimate is that it would have taken at least twice as long to develop the same functionality with any other language," Wilson said.

"There are a lot of things that Java brings to the table," such as standards, platform independence and ease of deployment, said Bill O'Donnell, a consultant to the State of Wisconsin in Madison.

Java has played a key role in several state projects to enhance existing mainframe applications, as well as building new ones that take advantage of mainframe data, he said. Unlike other languages that involve platform-specific coding work, "with Java, you can basically start with the business issues and worry about the back-end platform only later," O'Donnell said. ▶

Forum Meets to Speed Web Traffic

Protocol would help data routers, switches

BY JAMES COPE

A group hoping to bring speedier data-handling capabilities to networks based on Internet protocols will hold its first technical meetings next week.

The MultiProtocol Label Switching (MPLS) Forum (www.mplsforum.org), which was formed earlier this month in Fremont, Calif., by a group of network and communications companies, hopes to agree on standards for creating labels for IP data packets, which will make it easier for routers and switches to speed traffic to its destination.

The association, which will hold its first committee meetings April 3 and 4 in San Jose, said the MPLS protocol is a "critical component for extending best-effort IP networks to include support for traffic engineering, quality of service and virtual private networks" through integration of traffic engineering and routing functions.

MPLS promises to facilitate more rapid network customization to accommodate converging applications such as video and voice. The group hasn't said when products using the protocol will be available.

David Drury, vice president of technology strategy at London-based Marconi PLC, one of the association's founding companies, has been appointed president and chairman of the organization. ▶

TECHNOLOGY

All Out to Win 2k: One IT Manager's Story

Information technology manager **John Kronick** has added a Windows 2000 migration to an already full plate at his company, Norwalk, Conn.-based Purdue Pharma LP.

The pharmaceuticals firm's plans include securing a network that stretches across 25 sites, localizing content for overseas operations and building novice-proof virtual private networks (VPN) for satellite facilities. *Computerworld's* Cynthia Morgan spoke with Kronick about how his team will face the next 18 months' worth of challenges.

Q: How big is the infrastructure your team supports?
A: We're running 3,400 users over 25 sites around the world. We're going into countries that can't really support a regular dial-up connection, let alone something faster, and we can't always have trained support staff available.

We use VPNs in many cases, both for the savings it gives us in terms of equipment and connection charges and because with a VPN, we can do all the configuring and take care of most of the support issues from our end.

Q: That frankly sounds like a support nightmare.
A: It's [pause] interesting at times. [Chuckles.] We won't move to Windows 2000 as fast as we'd like, but it's not just a compatibility issue. ... This just isn't the year for Windows 2000 because nobody wants to take the risks of early adoption. Right now, there are too many bugs and too few people who can do the migrations.

The Windows 2000 migration will take 80 to 125 information technology workers, augmented with a lot of consultants. We're going to use consultants in many cases because we simply can't find people who've completed the training we need in Windows 2000.

Q: Then when will you migrate?
A: We're planning a full infrastructure rollout of Windows 2000 by Q1 next year. That'll move 200 to 300 servers. Windows 2000 certainly will let you run a hybrid, heterogeneous network, but you lose a lot of the reasons you're migrating in the first place. We're

not opting to do that. When we roll out Windows 2000 on the servers, it'll also go on all the clients.

The operating system on the clients isn't as important as it once was, frankly. A lot of our most important applications now are based in Oracle or the Web, so compatibility with a new operating system isn't something you necessarily have to worry about for your frontline apps. Ironically, it's the standard office software

that will be more of a problem.

One tip I can give anyone trying to support a migration to Windows 2000: Don't upgrade. Wipe out the system and start clean. It makes a real difference. ▶

Consumers Worried by Algorithm to Forge Smart Cards

BY ANN HARRISON

French smart-card users were in an up-roar last week after officials at French interbank group Groupement des Cartes Bancaires in Paris revealed that a known algorithm could be used to create forged cards for certain transactions.

The algorithm, which was posted anonymously on an Internet chat site, was developed three years ago by Serge Humpich, a computer cracker who was given a 10-month suspended sentence by a French court for illegally accessing Cartes Bancaires' data processing system, introducing data into the system and counterfeiting five bank cards.

Reassurances Offered

Humpich has predicted that forgers will be turning out false cards within weeks. But Herve de Lacotte, a spokesman for Cartes Bancaires, told Reuters that while forged bank cards could be used to buy train tickets and pay at parking meters or toll booths, they can't be used to withdraw cash or purchase expensive merchandise.

Such assurances have done little to quell the concerns of consumers in France, where 34 million bank cards contain embedded chips that are used to conduct everyday financial business, perform national health care transactions and make phone payments.

But smart-card vendors are trying to calm the fears the algorithm has provoked. "It was not the French smart card that was hacked; it was the French banking-card system that was potentially impacted," said a spokeswoman for France-based Gemplus Corp., which has issued 450 million of the world's 900 million smart cards. "The information that was published by the hacker was not coming from the card and cannot be reused in other applications."

Passions surrounding bank card security have run so high in France that Roland Moreno, the inventor of France's smart cards, has offered 1 million francs to anyone who can crack a card's security code.

"This is simulation, not penetration," Moreno told Europe 1 radio. "Chip cards remain secure."

Smart cards are far less commonly used in the U.S., where they are primarily used as network authentication devices for secure access to computer systems.

Microsoft Corp. announced last year that it would begin selling software for Windows smart cards, which authorize access to corporate networks. The U.S. Navy is also about to launch an extensive smart-card program for its personnel. ▶

A KNOWN algorithm can be used to create forged smart cards

BRIEFS

Avnet Computer Upgrades SDSM Software Utility

Avnet Computer announced last week that it has upgraded its StorServer Distributed Storage Manager (SDSM) software utility. Features of SDSM Version 3.7 include the ability to conduct data transfers over storage-area networks, tape resource sharing and network-free rapid recovery. Pricing information wasn't disclosed. Tempe, Ariz.-based Avnet Computer is a technology product integrator. *www.avnetcomputer.com*

Global Logistics to Develop Software for FedEx

Shelton, Conn.-based Global Logistics Technologies Inc. (G-Log) has announced an agreement to develop electronic-logistics software for Memphis-based Federal Express Corp. The software will be designed to centralize the management of freight services on a worldwide basis and ensure consistent, on-time deliveries at the best prices available.

G-Log's software will allow domestic and international carriers and shipments to be managed as a unified global logistics trading community via a secure Web portal. The community will be supported by a single, integrated business process.

FedEx will use the Internet to provide customers and trading partners with cost-effective, real-time access to information.

TAC Systems Unveils New Archiving Product

TAC Systems in Huntsville, Ala., has introduced the LANRedi ArchiveTurbo, its latest addition to the LANRedi Turbo line of archiving and digital-video-disc- and CD-mirroring network-attached storage products.
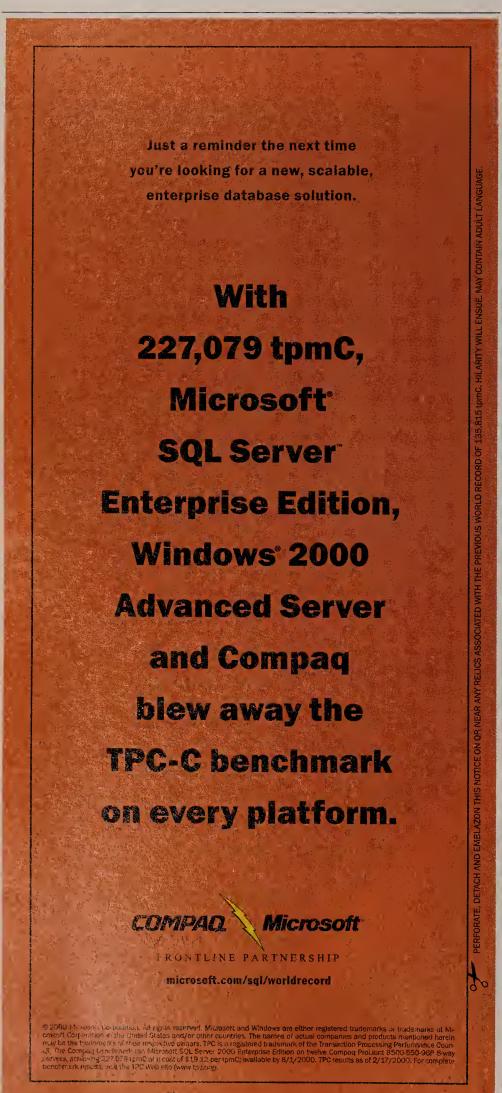
ArchiveTurbo offers online hard-disk storage for fixed-information files such as scanned images, illustrated parts catalogs and service manuals. File sharing can be done in mixed network environments, such as those that include NetWare and TCP/IP, and across multiple platforms, such as Unix, Linux and Windows 95, 98 and NT. ArchiveTurbo is available in standard, portable and space-saving models and scales from 50GB to 1.5 terabytes. Pricing begins at $5,034 for 50GB.

TAC Systems is a division of @fax Inc., also based in Huntsville. *www.lanredi.com*

New MTI Group Offers Storage Management

MTI Technology Corp. in Anaheim, Calif., has formed the MTI Federal Systems Group to offer storage management technology and support to civilian agencies, the Department

TECHNOLOGY

Wireless BlackBerry Service Winning Over Customers

BY BOB BREWIN

Although it's just a year old, the BlackBerry wireless e-mail service and terminal are already providing benefits for a number of corporate users, ranging from brokerage houses to attorneys.

Many other wireless e-mail services require that users have a separate e-mail address for the wireless device, but BlackBerry allows wireless users to maintain a single e-mail address.

The service and terminal from Research In Motion Inc. (RIM) in Waterloo, Ontario, is being resold by Compaq Computer Corp. America Online Inc. plans to use the BlackBerry service as part of its consumer service.

RIM also lets users tap into desktop e-mail systems, through partnership agreements with Internet service providers such as OneMain.com Inc. in Reston, Va., which has 700,000 subscribers. Lease of the device and unlim-

AMERICA ONLINE INC. has announced plans to use the BlackBerry service

ited use of the BlackBerry service costs $40 per month for each user.

While the Palm VII from Santa Clara, Calif.-based Palm Inc. offers similar wireless e-mail connectivity, corporate users have deployed BlackBerry in large numbers since its introduction in January. Financial services firm Salomon Smith Barney Holdings Inc. in New York plans to equip 2,500 employees with the BlackBerry service and RIM 950 terminals. Wireless provider American Mobile Inc. in Reston, Va., plans to deploy a RIM 850 device — though not the BlackBerry service — throughout its network. RIM's market could include more than 20 million Lotus Notes users through a partnership with IBM.

Law firm Paul, Hastings, Janofsky & Walker LLP in Los Angeles provided 350 of its attorneys with the BlackBerry service last year. "It was the best thing I did all last year," said CIO Mary Odson.

"Not a month goes by that I do not hear a success story."

For example, she said, during a recent deposition, a Paul, Hastings lawyer wanted to check a document that a witness mentioned. The lawyer made a quick call back to the office and had the document cut and pasted into an e-mail and sent to the BlackBerry terminal to prove that the witness' memory didn't match the document, Odson said. ▶

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of Defense and the intelligence community. The new group will be based in Sterling, Va.

According to MTI, the federal government storage management market is valued at more than $8 billion. MTI develops enterprise data storage servers and provides consulting services.
www.mti.com

CNT Appoints Schmit CIO

Minneapolis-based Computer Network Technology Corp. last week named Barbara Schmit its CIO. Schmit will oversee the company's global network infrastructure, global telecommunications systems, desktop services and business application services group. Computer Network Technology provides storage-area networking products, enterprise application integration tools and support services.
www.cnt.com

HighGround to Partner With Network Appliance

HighGround Systems Inc. in Marlboro, Mass., and Network Appliance Inc. in Sunnyvale, Calif., last week announced a partnership to offer automated storage capacity, usage and performance monitoring products for network-attached storage resources.

HighGround will integrate its Storage Resource Manager (SRM) with Network Appliance's filers. This will allow SRM to automatically discover, monitor and report on the stor-

age capacity, usage and performance of logical Network Appliance file systems.

As part of the agreement, Network Appliance made an equity investment of an undisclosed amount in HighGround, which received $30 million in recent financing.

HighGround offers storage resource management products for Windows NT, Unix, Linux and Microsoft Exchange. Network Appliance offers network file serving and caching products.
www.highground.com
www.netapp.com

Six Firms Join to Launch Fiber-Optic Cable Company

Six telecommunications firms and power companies have joined forces to create a fiber-optic cable company geared toward serving small to midsize cities from New York to Chicago.

The new venture, named America's Fiber Network, comprises utilities American Electric Power Co. in Columbus, Ohio; Allegheny Energy Inc. in Hagerstown, Md.; FirstEnergy Corp. in Akron, Ohio; and GPU Inc. in Morristown, N.J.; and telecommunications firms R&B Communications Inc. in Daleville, Va., and CFW Communications Co. in Waynesboro, Va.

The venture has formed a 7,000-mile network designed primarily for local and long-distance phone companies, wireless communications companies and Internet service providers. Financial terms of the agreement weren't disclosed.

Hello 'Little Black Book,' Goodbye IPX

Week 3: Pat checks out his ISP and plugs a security gap by — duh! — calling tech support

WHEN I OPENED the door to my lab, I nearly cried when I saw the museum pieces I was going to have to deal with. Granted, I have one 200-MHz Pentium with 128MB of RAM for my firewall, but the others are Pentium 133s with 64MB of RAM. The products I am testing, Internet Security Systems Inc.'s RealSecure and Network Ice Corp.'s IcePac, require a 300-MHz Pentium II and 128MB of RAM. RealSecure wouldn't even install! Luckily, my boss listened to my needs, and I am getting three new Pentium IIIs.

A circuit board on our Internet service provider's (ISP) Cisco Systems Inc. Catalyst 7500 blew out, so we were down for 14 minutes. Our ISP replaced the board immediately. Of course, it helps when you know two of the tech guys extremely well. The boards have approximately 12 ports on them, so we weren't the only ones who had their Internet service interrupted.

I took the opportunity to meet our ISP sales rep, and he invited us to see the network operations center (NOC). The ISP just finished construction of a new co-location facility that blew our team away. We were also able to view our DS3 from our ISP's perspective. The point-of-presence (POP) was really an incredible site. The cables were all color-coded — blue for T1, yellow for T3, gray for 10M bit/sec. and purple for 100M bit/sec.

I recommend visiting your ISP. Your business is completely dependent on your provider; you might want to make sure you have a friend in the right spot when and if something happens.

There was another network outage this week, this time at one of our warehouses. They have a mixed environment of PCs that connect back to our Windows NT domain and dumb terminals that connect to a Data General Unix server in Chicago. The call I got said they took a power hit and some people had connectivity and others did not. It turns out that the DG box that serves the terminals and connects to the Unix server had come up before the router did, so the terminals couldn't find the route to the server, because the router hadn't established the route. That was an easy fix.

An interesting situation arose during that fix. One of the server administrators didn't know the topology of the site and thus had a hard time doing any preliminary troubleshooting. My boss, the network architect, hadn't come in yet, and he's the only one who has that data. We decided to make the topology available to administrators as a little black book.

I sensed this was a great opportunity to begin testing my policy-making ability. After all, data about network topology is sensitive, proprietary information. It includes our entire global network structure, both physical and logical, including IP assignments and phone numbers for mission-critical contacts. I set up a meeting with the director of network services, two lawyers from our legal department and my boss to discuss how the policy should be written and implemented before the book is distributed.

One of my ideas is that if there is any change that needs to be made, everyone must bring their books in to be updated on the day specified — no exceptions! This would let us destroy the old information and keep track of the books.

Plenty of Porn

I was in the NOC, and one of the netadmins said he tried to follow a link to register an Internet domain and it took him to a porn site. I thought that was weird only because we use Websense for FireWall-1 to filter out those types of sites. When I looked further, it seemed as though Websense was acting like the trial version and had expired. Not good.

I knew we had purchased a license for the full product, so I called Websense's technical support people. They had me delete the corrupt database of Web sites and apply the new license key. I then stopped and restarted the service and tested it by trying to go to all the porn sites I could find. It worked.

The next day, the director of network services thanked me for fixing a situation that hadn't been resolved by the previous security officer. All I did was call the technical support people, who got me up and running in two minutes.

The next day I took a Windows 2000 file and print server class that proved to be very useful. I am going to take as many Windows 2000 classes as I can; it is an entirely different beast from NT.

Just Do It!

The class coincided with a preliminary meeting I had with our CIO and chief e-commerce officer to discuss a possible global intranet or corporate portal site. They feel that it will be a snap to set up and that it should be ready in May. Well, not so fast, I said; our programmers just got off the learning curve of developing 32-bit applications and Web apps from old Cobol and Visual Basic 4 applications that still run in 16-bit mode! But we'll be going ahead anyway. "Business necessity," they said.

To handle the encryption and security management for this global intranet, we are deploying Windows 2000 with Active Directory. We will take the time to configure our domain structure and organizational units on a logical level, and, at the same time, we will have to consider the hardware. The domain controllers in Windows 2000 run similar threads to Exchange 5.5 and SQL Server, so with Active Directory we will need a lot more horsepower.

Instead of desktop servers with juiced up RAM, we are looking at dual to quad processors, a dual to triple SCSI channel and 1 to 2GB of RAM. Management wants to move to more of a Web-based environment, so we are looking for a new operating system. Since we're a straight NT shop, we might be moving from Windows 95 to Windows 2000, or we might stay with 95 and use 2000 Terminal Server to provide the desktop.

This weekend, I plan to rip IPX and several other services out of the firewall. I will also test the anti-IP-spoofing feature of FireWall-1 in the lab, since the previous team couldn't get it to work. We have an internal network, a demilitarized zone (DMZ) and then the Internet. The configuration on the DMZ is what makes me nervous, since it is a separate valid Class C network from the Internet Class B network.

If you have any suggestions, send them to pat_rabbinski@hushmail.com, or visit our new security forum at *www.computerworld.com/sjf.* Until next week, remember: The safest way to secure a network is to unplug it! ▶

■ This journal is written by a real security engineer whose name and employer have been disguised for obvious reasons. It's posted weekly at www.sans.org and www. computerworld.com to help you and our security manager — let's call him Pat — better solve your security problems. Contact him with comments or advice at pat_rabbinski@hushmail.com, with the subject line Pat's Journal.

Security Manager's Journal

Authentication

BY RUSSELL KAY

WHO are you? Do you belong here? What rights do you have? And how do I know you're who you say you are?

Those are the essential questions that any effective security system must answer before a user can access a computer system, network or other protected resource. We think this is what a password system does, but passwords are only one part of an effective security system. That security system requires three separate elements — identification, authentication and authorization — that together make up what's called access control.

When you log into a computer or network, the first thing you're asked for is a user name or account name. But a user name offers little protection to the system. Therefore, the system also usually prompts you for a password, a form of authentication.

Authentication

The question, "How do I know you're who you say you are?," is in many ways, the most important one. Unless it's answered satisfactorily, identification is incomplete and no authorization can or should take place. But how does a system verify that a user is who he says he is? Simply entering your password doesn't prove it's you. Someone else could know your password.

The answer lies in a strong authentication process. Basically, the following three factors can be used to authenticate an individual:

1. Something the user knows. This is a reusable password, passphrase, personal identification number or a fact likely to be known only to the user, such as his mother's maiden name.

2. Something the user has. This could be a key, a magnetic-stripe card, a smart card or a specialized authentication device (called a token) that generates a one-time password or a specific response to a

> ## DEFINITION
>
> **Authentication** is the process through which the identity of a computer or network user is verified; it's the system that ensures that an individual is, in fact, who he claims to be. It's distinct from **identification** — determining whether an individual is known to the system — and from **authorization** — granting the user access to specific system resources based on his identity.

challenge presented by the server.

3. Something the user is. This depends on some inherent physical trait or characteristic. Often called biometrics, examples of this form of authentication include: fingerprints, retinal (eye) patterns, hand geometry, voice recognition, facial recognition, typing pattern recognition and signature dynamics (speed and pressure, not just the outline).

For more on biometrics, see "Give Your Computer the Finger" on page 78.

These authentication factors are listed here from weakest to strongest as determined by how difficult they are to forge or fake. By themselves, each of these methods offers some security. However, each has its own problems or weaknesses.

Anyone can enter a password and, historically, reusable passwords have been vulnerable to guessing, brute force and dictionary-based attacks.

The second means of authentication — something the user has — requires the user to possess an often difficult-to-

replicate device. However this stronger protection also costs more (typically tens of dollars per device), and it requires contingency procedures in case a device is left at home, lost or stolen.

The third type of authentication — something the user is — is the most difficult to defeat, but it has other problems. Biometric identification methods are subject to two types of errors: false positives and false negatives. The first erroneously authenticates an individual who shouldn't be authenticat-

ed; the second denies an individual who should be authenticated. Neither error is desirable, and it's important to know and verify error rates when considering such a system.

Another problem is that permanent physical changes or temporary ailments or accidents can alter or render unreadable the measured characteristic. If you cut part of your fingertip, you've changed what the fingerprint reader sees. Put on a Band-Aid, and the reader can't see the fingerprint at all.

Finally, if the method is compromised, there's no way to give an individual a new identifying characteristic. You can issue a new password or security token, but you can't change his fingerprints or eye pattern.

Two-Factor Authentication

For greatly increased security, the approach preferred by experts is to use two of the three methods in combination — a process called two-factor authentication. For example, to use a security token that generates a one-time password, you may need to enter a personal identification number into the token itself. Similarly, a card-key can be used in combination with a biometric system.

This is essentially what happens when you check in at an airport ticket counter. You hand over your ticket, which identifies you. Then you show a photo ID of some kind. This is something you have with you, and it's biometric (something you are) in that the clerk has to determine that the photo on the card matches you.

Once a user has been identified and authenticated, what remains is to grant him access to whatever specific system resources have been approved. This authorization is usually accomplished by looking up that user's entry in an access control list that delineates specific rights and permissions. These can be based, among other things, on an individual's identity or job function, membership in a workgroup or other classification or time of day or day of week. ▶

Authentication via Security Token

SecurID

A hardware authentication device, or security token, provides greatly increased protection against spoofing or brute-force attacks. The time-synchronized SecurID card from RSA Security Inc. in Bedford, Mass., has an LCD screen that shows a string of numbers that changes every minute. The user types in his user name at log in, then the number shown on the card. The host system knows what that number is supposed to be for that user at that particular time. Some tokens don't show a number continuously but require the user to enter a PIN on the card itself before the number is displayed, thus providing two-factor authentication.

Challenge-Response Systems

With a token-based Challenge-Response system, the system displays a number (the challenge) when you log in. The user types this number into his token, which encrypts that to produce a second number (the response). The user enters the response into the computer. The host performs the same operation on the challenge, then compares its result to the user's response. If they match, the user is authenticated.

Give Your Computer the Finger

Do you secretly suspect that after they made you they broke the mold? According to the nine biometric security products we tested, you're right. By Howard Millman

WHEN YOU need better protection than a password system can give you, it may be time to consider using a biometric authentication device. In our tests, these devices proved affordable, reliable, easy to use and light-years ahead of passwords in boosting desktop, laptop and network access protection.

Not only are passwords easily compromised, they don't authenticate people — they merely authenticate passwords. Conversely, each fingerprint is unique. With biometrics, you'll never have to remember multiple, sometimes counterintuitive alphanumeric sequences. All you need to remember is to bring your finger or face, or how to sign your name.

Biometric devices measure one or more physical attributes. The most commonly used attribute is your fingerprint, but it can also be the shape of your face, the pattern of your eye's iris, your signature or the sound of your voice.

Devices exist to meet any degree of security and paranoia. For example, if you want ultrasecure access to the ICBM missile silo or an anthrax lab, retinal-scan devices that read the pattern of blood vessels inside eyes are available. We confined our tests to noninvasive devices suited for use with computers and networks in a normal business environment.

"Biometrics have been around a long time while the vendors tried to get the technology and price right. Finally, fingerprint scanners are a here-and-now technology," says Chris Christensen, a security analyst at International Data Corp. in Framingham, Mass. Starting this summer, manufacturers like Compaq Computer Corp. will ship laptops equipped with biometric devices.

With prices dropping and accuracy increasing, the future looks promising for vendors. According to New York-based consulting firm International Biometric Group LLC, the market for biometric devices totaled $260 million last year. The company predicts a 30% to 40% annual growth rate.

All the products we tested are ready for use and were designed for existing machines. The devices cost between $60 and $395 and offer vastly increased security. All products were installed effortlessly, required no maintenance and delivered consistent accuracy.

Digital Persona Inc.'s U.are.U Pro offers a major advantage over the other products — a single cable connection to the Universal Serial Bus (USB) port in machines running Windows 95/98, NT and 2000. The other devices require a connection to the parallel port, a power source (usually the keyboard connector cable) and a printer pass-through when a printer is connected to the same machine.

Aside from the convenience of a USB connector, hardware from the other vendors performed equally well. When used on a Windows NT network and integrated into NT's Security Access Manager, all the devices provided security far superior to a mere password.

Biometric vendors tend to sell either just the software engine, such as Identix Inc.'s Bio-Logon and Cyber-SIGN Inc.'s Cyber-SIGN, or the hardware, such as products from SCM Microsystems Inc. and Interlink Electronics Inc. Others vendors, such as Keyware Technologies and Digital Persona, offer both.

Other than Digital's Persona's custom-developed USB driver for Windows NT, we found no major differences in the ease of use, reliability or feature set in any of the software. All the vendors mentioned plan to release USB versions of their products for Windows 2000.

For information technology use, the device chosen should be based as much on price as on desktop space. Most fingerprint scanners and signature readers are stand-alone devices, but Key Tronic Corp.'s Key Tronic Secure Keyboard integrates a scanner into a keyboard. The

bundling saves space, and help desks may prefer built-in devices to those added on.

Since pressing a finger is slightly easier than writing your signature or mugging it up for a camera, fingerprint scanners have a slight edge in usability. All devices also allow password entry in the event that the biometric recognition fails, perhaps as the result of an accident or illness. To help prevent erroneous access denials, authorized users should register multiple fingers. ▶

Millman operates Data System Services LLC, a consultancy in Croton, N.Y. Contact him at hmillman@ibm.net.

U.are.U Pro

Hardware and software; fingerprint
Digital Persona Inc.
Redwood City, Calif.
www.digitalpersona.com
(650) 261-6070
$199 with client software
Server software: $29 per user

The all-around winner. Highly accurate with inexpensive, single-cable USB connectivity. The software shows its heritage as a onetime consumer product – it's entertaining and simple to understand. Users enroll and set up security via an overlay to Windows NT's Management Console. Utilities include a one-touch Internet log-in, which eliminates the need for passwords, and private space, a virtual drive that stores encrypted data.

BioTouch

Hardware; fingerprint
SCM Microsystems Inc.
Los Gatos, Calif.
www.scmmicro.com
(408) 370-4888
$179

BioLogon 2.02

Software; fingerprint
Identix Inc.
Sunnyvale, Calif.

TECHNOLOGYEXEC TECH

(408) 731-2000
www.identix.com
Server: $900 for 25 users
Client: $40

A welcome and convenient innovation, the BioTouch delivers affordable and reliable access security for laptop users. The BioTouch slips into a PC card slot and incorporates a fingerprint-scan sensor on a slide-out tray. Powered by the laptop, it requires no external cables or connections. Simple, reliable and consistently accurate, it's an ideal way to retrofit existing laptops running Windows 95/98, NT or 2000.

Unlike passwords, the BioTouch can't be defeated by simply removing the CMOS battery or by amateurish hacking. When connected to a BioLogon-enabled network, the laptop will use the security profiles set up for the network server.

The software engine for the BioTouch (and a variety of other fingerprint-scanning hardware), BioLogon offers centralized network management plus remote user enrollment and access. BioLogon's user profiles can enroll multiple users, each with different rights. Users can access the network from other computers.
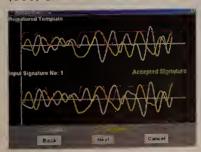
Identix offers a version of BioLogon that runs on Novell NetWare 5 and supports NetWare's LDAP server.

ePad

Hardware
Interlink Electronics Inc.
Camarillo, Calif.
www.interlinkelec.com
(800) 340-1331
$70

Cyber-SIGN

Software; signature dynamics
Cyber-SIGN Inc.
San Jose
www.cybersign.com
(800) 876-4605

$50 per user
Server: $1,250, unlimited users

A compact signature pad that's easy to install and use. Cyber-SIGN's software analyzes the shape, speed, stroke, pen pressure and timing information as you sign your name. Even my daughter, who forged my signature to her report cards for 10 years, couldn't defeat the system. Stunningly accurate, it allows enough leeway so that casually signing your name with an extra flourish enables access, but any major variation will deny access.

Key Tronic Secure Keyboard

Hardware, fingerprint;
Uses BioLogon software
Key Tronic Corp.
Spokane, Wash.
www.keytronic.com
$150

We give high marks to the Key Tronic keyboard for its consistent accuracy and high reliability. And as an integrated keyboard and fingerprint scanner, it doesn't increase desktop clutter. The 104-key keyboard offers good tactile feedback and looks like any other, except for the addition of a small fingerprint scanner off to the side.

Datawise MT Digit

Hardware, fingerprint;
Uses BioLogon software
SCM Microsystems
Los Gatos, Calif.

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www.scmmicro.com
(408) 370-4888
$130

An accurate, mouse-size stand-alone fingerprint reader.

Biometric Screensaver

Hardware and software;
Multiple authentication
Keyware Technologies
Woburn, Mass.
(781) 933-1311
www.keyware.com
$395.95

With three authentication procedures (voice, facial recognition and fingerprint), The package offered the highest degree of noninvasive security of all the products we tested. In our trials, we couldn't gain access using all three methods, but we did consistently achieve access with any two. You have the option of using all three at once, two at a time or any one of the three. You can also create a weighted security system that values one or two devices over the others.

It requires a separate product to control log-on (not tested), and the screen saver secures systems that users want to leave running while unattended.

The package includes a small video camera that perches atop the monitor, a microphone and a fingerprint scanner. Less costly packages are available for users who already own one or more of the devices. We tested parallel port versions of the camera and scanner. Keyware says USB versions are now available.

TouchPass

Hardware and software; fingerprint
NEC Technologies Inc.
Arlington, Va.
www.nectech.com/afis/pid
(703) 247-8900
Server: $1,000, unlimited users
Client: $200, includes hardware

Exclusively designed for use in an enterprise, TouchPass requires a Windows NT domain server. It won't operate in a stand-alone mode like the other devices. The NEC software integrates into Windows NT's Security Access Manager and User Manager. It offers good centralized management and replicates authentication communication protocols to other domain controllers.

MOREONLINE

For more on other security-related issues, visit our Web site.
www.computerworld.com/more

Don't Hide the Goods

When designing an e-commerce site, make sure customers can see the stuff you're selling.
By Mathew Schwartz

CONTENT MAY BE KING, but for retail sites, it doesn't pay the bills. Online retail startup Foofoo.com Inc. learned to surround its products with relevant content, rather than the other way around. Another thing the company learned as it redesigned its site: Build an architecture that makes it easy to change, because you'll always be reinventing yourself.

Lesson 1: If You're Gonna Sell, Sell

Arlington, Va.-based Foofoo.com launched its community site for "the fun and finer things in life" last July. The business proposition was simple: The site licenses content from high-end magazines such as *GQ*, *Vanity Fair* and *Elle*, then packages the content to do what the publications usually won't: use the stories to blatantly sell products.

But consumers weren't buying the "content begets sales" shtick. They would click on section titles and read the stories but not click on the accompanying product links. Testing revealed that "people perceived our product links as ads," rather than as a place to buy products, says Philip Hawken, Foofoo.com's director of commerce and one of the site's founders. The very content Foofoo.com licensed was preventing it from making sales.

To drive users to the products, Hawken inverted the overall approach. Instead of placing links to products in a separate shopping area next to articles, he gave the products more prominent placement and surrounded them with links to relevant articles. The separate shopping area that so confused users was eliminated and shopping was integrated into the whole site. Links to the customer's shopping cart and account information were added to the home page to reinforce the impression that, yes, this was a commerce site. User testing also indicated that the 40 to 50 products normally seen on a page were visually overwhelming and slowed download times to unacceptable levels. So Hawken allowed only six products on any one page.

Users responded. Product sales have risen from 15% to 20% of overall revenue to 25% to 30%, which is closer to the 50% the Foofoo.com business plan calls for. So far, so good — product sales have already increased about 50% since the redesign.

Another important change involved axing, renaming or consolidating 10 lifestyle sections into four sections with more action-oriented titles such as Decorate and Entertain. In addition, "We killed about 150 products, and are going through and replacing them with items that relate to the new sections better," says Hawken.

Lesson 2: Plan to Rebuild

Serving up the right mix of content and products and figuring out how to package it all is a never-ending experiment. So Foofoo.com launched with a site architecture that could be changed constantly. The company opted for Microsoft Site Server, with all pages fed from a SQL Server database running on Windows NT. Templates pull content from the database and mix it with such things as background color, graphics and relevant articles. "Using templates

[WEB SITE MAKEOVERS AN ONGOING SERIES]

TECHNOLOGY E-COMMERCE

made the redesign a lot easier. This is a major redesign of the site, and we did a furious reshuffling of how the pages are designed," says Hawken.

Because the Microsoft Active Server Pages are dynamically served, changing the look of the site doesn't affect the back-end systems. Also, every product is tied to a specific department identification number. Using the netAnalysis tool from Cambridge, Mass.-based netGenesis Corp., Foofoo.com tracks every query made on a product, so it can see not only how many times a product was viewed, but also how many units were sold. Because products have codes attached to them, site redesigns don't make it harder to see historical sales information.

Templates also make it easy to add new content. When a page is dynamically served, the database is referenced for the most relevant articles for the products mentioned on that page. So new articles have to only be added to the database, not designed into a new page. A range of custom Web administration tools makes managers responsible for maintaining their own sections. The higher the level of automation, says Hawken, the less redesign must be dealt with daily. "If history tells me anything, in four months we'll do it again," says Hawken. "Until then, there are other things to focus on." ▶

Foofoo.com Inc.

Location:
2700 South Quincy St.,
Suite 320
Arlington, Va. 22206

Web: www.foofoo.com

BUSINESS DETAILS
Company started: January 1999, Web site launched July 1999, now on Version 3

Original business plan: Build online community for "the fun and finer things in life," using content to drive users to purchase high-end products

Head count: 13 on staff with three employees designated for site redesign work; also uses many third-party firms; much development outsourced to Etensity in Vienna, Va.

Funding to date: Tribecca Partners, an Arlington, Va.-based venture capital firm, and individuals

Profitability: Estimates profitability within two years; no date set for initial public offering

Revised approach: Site redesigned to focus more on products, not content

Revenue model: Advertising and sponsorships account for 70% to 75% of revenue. Plan calls for product purchases to be 50% of revenue as soon as possible.

Customer demographics: 55% male, 45% female; 50% single or married; median income: $100,000; average age: 33

TECHNOLOGY USED
Order servicing and statistics: OrderTrust Inc., an order-fulfillment outsourcing firm in Lowell, Mass.

Inventory: Virtual, handled by about 70 partners

Back-end systems: Microsoft Site Server, Active Server Pages, served from SQL Server database
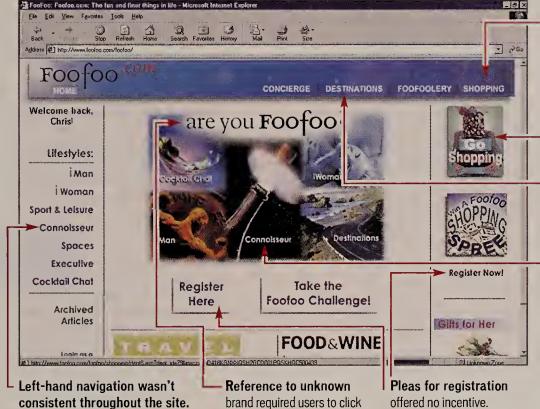
Web server hosting: UUNet Technologies Inc. in Fairfax, Va.

Web site monitoring software: NetAnalysis from netGenesis

Link validation: Doctor HTML: www2.imagiware.com/RxHTML.

Buffing Up a High-End Online Retailer

Foofoo.com's site logs showed that users were reading the content but not taking the bait and buying products mentioned in the articles. Problems in the earlier version (top) included vague section titles and an isolated shopping section. So in the current version (bottom), Foofoo integrated shopping throughout the site and gave vague section titles a more action-oriented spin — for example, "Concierge" became "Entertain."

The shopping area was separate from content. Users didn't take the bait.

Vague name for travel section. Like other sections, the title – a noun – didn't drive users to act.

Section names were awkward: What did Connoisseur contain? Destinations, for instance, was simply renamed Travel in the new version. Ten different categories and 10 to 15 promotions at any given time on the home page overwhelmed users.

Left-hand navigation wasn't consistent throughout the site. Sometimes users had to go back to the home page to get these navigation options.

Reference to unknown brand required users to click to uncover the site's purpose.

Pleas for registration offered no incentive.

Most "buckets" – places for users to go – were dramatically redefined, consolidated or eliminated, based on which products sold well and which category titles got users there. Furthermore, static section titles were been replaced by action verbs, meant to drive users to action.

Introduction of banner advertisements gives greater emphasis to sponsors, because they and partnerships still account for 70% to 75% of all revenue.

New tag line attempts to explain Foofoo.

Increased exposure to products, which drives revenue instead of content.

Redundancy is good. Content sections now further define which products consumers can find in each section.

Valuable real estate: Products with a home page promotion get three times as many page views as other products – and they sell more than twice as much.

Tools to store and manage data top IT managers' spending plans this year, according to a *Computerworld* survey.
By Cynthia Morgan

ENTERPRISE DATABASES and storage-area networks (SAN) are the two most crucial buying decisions facing information technology managers this year, according to an exclusive *Computerworld* survey.

Other priorities this year, ranked in order according to the number of times they were cited by survey respondents, include replacing older desktop PCs, providing high-speed Internet access for telecommuters, implementing security and managing Web content.

Computerworld surveyed 223 IT managers who plan to acquire technology products this year and asked them to name the three most important purchasing decisions they'll make.

Those surveyed support an average of 3,578 users at an average of 62 sites and have an average IT budget this year of $16.7 million.

Enterprise database projects topped nearly everyone's list. Respondents say they need database applications that can scale dramatically, function as part of e-commerce sites with ease and support capabilities that may not have existed a decade ago.

Rochester Gas and Electric Corp. (RG&E), for example, is considering upgrading its existing databases this year to better support a planned geographic information system (GIS), says Paul Ruganis, vice president of information services.

People and Pipelines

The Rochester, N.Y.-based utility will use GIS technology to help track personnel and equipment. "We have a substantial network of gas and electric pipe and wire facilities and a very mobile workforce," says Ruganis. "Now that Y2k is behind us, we can concentrate on finding better ways to allocate that workforce and manage data for customer support."

Ten years ago, an ice storm wreaked havoc with RG&E's data systems. Finding no single commercial software package that could cope with its wide-ranging demands, the utility built its own Sybase Inc. applications that interface with a combination of IBM DB2, Saga Software Inc. and Microsoft Corp. SQL Server database applications. Now the company needs to trim down to one database platform that can scale to levels unheard of a decade ago.

"This is a major, major undertaking that will take 25 to 30 months and come in north of the $10 million level," says Ruganis.

Corporate data keeps growing and must be stored somewhere. So SAN purchasing decisions made the second spot on the list of IT spending trends.

"As more companies try to enable their network infrastructure for e-commerce, they're finding themselves with data management problems [and] load balancing issues, and they move into an area that is pretty unmanageable without something like a SAN," says Jon Kronick, an IT manager at Purdue Pharma LP, a pharmaceuticals company in Norwalk, Conn.

Scalability, Performance

Purdue Pharma will be choosing SAN vendors and components within the next three months and will base its decisions on products' scalability, performance and ability to support network-attached storage, Kronick says.

Those factors are also important to Shahri Moin, manager of information systems and technology at IntraNet Inc., a Newton, Mass.-based company that builds electronic-payment systems.

Moin's group will start small with its SAN, a system from Sunnyvale, Calif.-based Network Appliance Inc. that will support 60GB at first and grow as its capabilities are proved.

"Cost and reliability were very important considerations for us," he says, "but even more important

IT Spending Tren
Data is Ki

TECHNOLOGY

was Network Appliances' multiplatform support."

IntraNet has taken a do-it-yourself approach to replacing desktop PCs, the third-hottest item on IT shopping lists this year. Moin's team assembles its own PCs using top-line motherboards and components, currently building 500-MHz systems based on chips from Sunnyvale-based Advanced Micro Devices Inc. The PCs have 128MB of RAM, 10GB hard drives and 50-speed CD-ROMs. They cost about $500 apiece, not including the monitor.

"Similar systems from Dell or IBM would cost us $1,000," Moin says. "It takes us 15 minutes to put one together, and we're able to control quality, reliability and maintenance that way."

Quality control and reliability were a common thread among survey participants. All of them said a vendor's reputation for reliability was an important factor in choosing a system, as was the quality of support after the sale.

Data management via the Internet tagging language XML may turn out to be the answer to "the biggest question I have this year: What is B-to-B?" says Jay Leader at Nypro Inc. "But then, of course, I have to ask the question, 'What's XML?' And I don't have the answer to that one — yet."

"Right now, we're creating personalized extranets for our customers to give them order information and share critical knowledge between engineers," says Leader, the director of application development at the Clinton, Mass.-based manufacturer of injection-molded plastic components. "We're being proactive, so we have the luxury of luring customers to our Web site to view information in our formats. But pretty soon, they'll demand we come to their sites" or e-mail specific data in a specific format at a specific time, he adds. "XML gives us a way to do that relatively painlessly."

But Leader says his team faces a number of obstacles: "Let's say we settle on a DTD [document type definition] for the plastics industry. Now we can talk to other people doing XML for plastics. But we sell to customers in health care and PC manufacturing; how do we integrate with their industry DTDs? That problem makes Unix standards look like a picnic."

Fast Remote Access

Supporting telecommuters with high-speed Internet access such as cable modem or Digital Subscriber Line connections was the fourth most frequently mentioned item on the list of survey respondents' purchasing priorities.

Several managers say the scarcity of qualified programmers, support technicians and network administrators has been pushing all forms of telecommuting up the priority lists.

Problems involved with connecting securely and cost-effectively with telecommuters, satellite offices and overseas facilities have boosted reliance on connecting via the Internet through virtual private network (VPN) technology at Nypro, says Leader.

"We're trying to do a global VPN right now, and it's not easy," he says. "The U.S. is a layup; anyone can get connected here if they have enough money. But doing it effectively in Europe, China [or] South America, where the local providers aren't that great — now that's a different proposition." And it's one that will occupy Nypro for the greater part of a year.

Purdue Pharma's Kronick says he agrees that VPNs will be a hot topic. "VPNs, firewalls, PKI [public-key infrastructure] — anything security will be big, big, big, big for us this year," he says. "With a secure VPN, for example, our employees in China don't have to know much to set up a secure connection."

Security Is Another Priority

Security is a chart-topper this year for Ruganis at RG&E. "We have home-baked network security that will be updated this year," he says. "We're trying to decide between building it internally, outsourcing it or using commercial packages. Commercial security can have problems because everyone knows it. But what if the guy who builds your homegrown security gets hit by a bus?"

Kronick's teams must cope with a mountain of federal regulations that mandate strict security procedures. In response, they're putting together a sophisticated PKI network that will safeguard a network of 3,400 users at 25 sites worldwide, using a fingerprint-based authentication system and smart cards.

Finishing up a Windows 2000 deployment is the one thing that won't happen this year, Kronick says. Although his company fully intends to deploy the operating system early next year, right now it "just has too many bugs and too few people who are skilled enough in Windows 2000 to do the work," he says. And despite Microsoft's additions of Kerberos/PKI, smart cards and biometrics support to Windows 2000, he says, "We're having problems getting Windows 2000 to support our PKI system."

While it didn't appear on *Computerworld*'s initial survey checklist, several respondents pointed out that localization of computer systems will become more important as the year progresses.

"You really can't demand that your overseas employees and customers speak, read and write perfect English," warns Leader. "The more we automate our systems, the more stuff we put on the Web, the more we'll have to supply it in local formats." ▶

Top IT Purchasing Decisions in 2000

The top 10 buying decisions IT managers will make this year

DECISION	% WHO INCLUDED IN TOP THREE
Enterprise databases	95.1%
Storage-area networks	82.9%
Desktop replacement systems	77.7%
High-speed Internet access for telecommuters	68.2%
Security	63.9%
Web content management	48.6%
Web performance	41.3%
Web-database connectivity	37.3%
Wide-area network infrastructure	26.3%
Web personalization tools	12.5%

What do IT managers consider when investing in an enterprise database?

DECISION	% WHO INCLUDED IN TOP THREE
Extensive platform support	61.1%
Scalability	58.9%
Price	54.4%
Performance	49.2%
Level of integration with future systems	41.3%
Level of integration with legacy systems	36.7%
Availability of development tools	29.8%
Availability of administration tools	25.2%

What do IT managers look for when choosing a SAN?

DECISION	% WHO INCLUDED IN TOP THREE
Support for network-attached storage	56.4%
Speed/performance	54.5%
Scalability	49.7%
Ease of management	45.3%
Adherence to industry standards	37.9%

What do IT managers look for when buying desktop replacement systems?

DECISION	% WHO INCLUDED IN TOP THREE
Vendor's reputation for reliability	100.0%
Support for thin-client architectures such as Citrix MetaFrame	85.1%
Quality of vendor support	81.8%
Remote/network maintenance support	65.6%
Long-term total cost of ownership	58.9%
No floppy drive (for security purposes)	46.5%
Java support	45.9%
Purchase price	44.6%
Easy-to-upgrade components	25.6%

Based on an exclusive *Computerworld* survey of 223 IT managers who acquire technology for their organizations. More than one response was allowed. participants were asked to name their three most critical purchasing decisions.

How to Find Devices Without Guesswork

Visionael's product promises to help locate and manage numerous network devices

BY AMY HELEN JOHNSON

IT'S MONDAY: Do you know where your routers are? Can you really pinpoint the exact physical location of every device on your network?

If you can't, you might want to talk to Visionael Corp. The Palo Alto, Calif.-based company has a product that collects information about a network's hardware, how it's interconnected and what applications are running where. It could be everything you need to plan and maintain your corporate connectivity infrastructure.

Visionael's eponymous product, now at Version 5.1, is aimed at the information technology department's network designers and maintenance staff — the people who install and deploy the hardware, says CEO Marc Jones. Visionael takes traffic data from widely used network management tools, like those from Austin, Texas-based Tivoli Systems Inc. It combines that data with a library of device-specific information so engineers can view both the logical and physical sides of network devices.

Getting a Picture of Assets

In the end, says Jones, companies get a complete picture of their network assets, which allows them to maximize the use of existing devices and better plan additions to and reorganizations of the network.

Visionael is appealing to IT shops that support large, complex networks, says John Morency, executive vice president of consulting at high-tech industry observer Sage Research Inc. in Natick, Mass. These IT departments are under pressure to produce a level of service quality that's measurable and can be monitored. A product that can help boost network availability and performance is highly desirable, says Morency. Visionael's reporting features and automation address these key IT requirements. One benefit is that it rescues support personnel from routine monitoring, freeing them to work on more proactive tasks, he says.

Morency also cites Visionael's scalability as a significant asset. "To provide this capability across tens of thousands of managed elements is not trivial," he explains. Plus, in order to be effective, the library of elements has to be extensive and include information on all the products and their features. Visionael's library allows it to flag important issues.

For example, Morency says, one common network problem is when a device is running an outdated software version. Discovering this — a relatively straightforward asset problem — can be difficult with a network monitoring product.

Jones cites the product's collaboration and project management features as time-savers for network engineers.

RESOURCE NEEDS CAN CLASH when large networks are managed from multiple locations, says Visionael CEO Marc Jones, left, with Vice President Richard Zambuni

Visionael Corp.

Location: 410 Cambridge Ave., Palo Alto, Calif. 94306

Telephone: (650) 470-8920

Web: www.visionael.com

The technology: Network hardware asset management

Why it's worth watching: Product helps with planning new networks and maximizing use of existing networks

Company officer: Marc Jones, president and CEO

Milestones:
• 1997: Company founded
• January 2000: Acquired NetSuite Development Corp.

Employees: 100

Burn money: $21 million; investors include VantagePoint Venture Partners, GE Equity Capital Group, and Capital Communications

Product: Visionael 5.1

Customers: The Chase Manhattan Corp., Lehman Brothers Holdings Inc., Lucent Technologies Inc., AT&T Global Services, Convergent Communications Inc.

Partners: Hewlett-Packard Co., Cabletron Systems Inc., IBM, Oracle Corp., Cisco Systems, Remedy Corp., Sybase Inc.

Red flags for IT:
• Risk-averse IT departments will want the reassurance of a brand-name partner to guarantee the longevity of this system.
• If one of the large networking companies enters the market, Visionael could be crushed.
• Outsourcing network functions could be more cost-effective and eliminate many headaches.

There are often clashes for resources, he says, especially in corporations with more than 5,000 employees that have networks that are managed from multiple locations. Visionael's database can keep track of who is changing what device, so potential conflicts don't occur. Updates are sent over the network so everyone is informed about changes.

Device Library Expands

Visionael recently acquired Boston-based NetSuite Development Corp., a developer of network discovery and design software. Jones says this will expand Visionael's device library and give it improved logical design capabilities to complement its current facilities for physical design.

Visionael Vice President Richard Zambuni says it's part of a push to win the big-fish position by the time the mass market for these products evolves. Although the playing field is fairly clear at the moment, Jones says one potential problem he worries about is major players — such as current partners Cisco Systems Inc. or IBM — deciding to enter the game.

Morency agrees that those types of companies pose a serious threat. "At the end of the day, it's really name recognition that's going to win [IT managers over]," he says.

That leaves the door open for a respected networking company to enter the market. That desire for brand-name security also factors into Visionael's ability to penetrate the large enterprises, which Jones targets as one of the company's sweet spots. Visionael's partnering agreements with established network equipment vendors will be a valuable selling point, enabling the company to offer complete networking systems, he says.

Morency says he sees another threat to the company: businesses deciding to outsource their network management. If that happens, planning and maintenance tasks will shift outside the IT department to application service providers and Internet service providers, shrinking the customer base. ▶

Johnson is a Computerworld contributing writer in Seattle.

Fighting the Tried and True

One problem for Visionael is that IT departments like to stick with familiar names for their mission-critical products, says Sage Research's John Morency. This gives well-established network management vendors like IBM's Tivoli division, Hewlett-Packard Co. and Cabletron Systems Inc. an advantage, even if their products' features don't compare directly. And there are a few other products that Visionael needs to keep in mind, says Morency.

Netcool

Micromuse Inc., San Francisco
www.micromuse.com
Micromuse's Netcool product could one day compete with Visionael. Right now, its capabilities include monitoring network events and pinpointing trouble spots, with a focus on providing tools for maintaining network availability.

Spectrum

Aprisma Management Technologies, Durham, N.H.
www.aprisma.com
Aprisma is the new name for the September 1999 spin-off of Cabletron that's devoted to selling the company's Spectrum line of software tools. The suite covers not only network management but also systems and applications.

iView

Opticom Inc., Andover, Mass.
www.opticominc.com
The iView suite covers service levels and availability and has modules for capacity planning, asset tracking and data analysis. Morency says he praises iView for its asset management and autodetection capabilities.

Visionael's Strengths

What Visionael has to sell is scalability and knowledge management, Morency notes. In terms of workflow, almost all the products are comparable. Also, there's a lack of innovation and new products in this space; if Visionael can sell its products as a step toward the future, it has an edge. One area where Visionael is staking a claim is with what it calls "new-wave service providers." These are companies that offer IP services that use burgeoning technologies like digital subscriber line and long-distance fiber. They need to grow their networks aggressively and are more open to newcomers like Visionael. Windows NT support is a key capability.
— Amy Helen Johnson

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Road Rage

Companies are going after remote and mobile computing with a vengeance, creating lots of opportunities for IT pros with the right skills. By Jill Vitiello

WHEN THE PRUDENTIAL Insurance Company of America authorized a pilot project to equip 500 agents with IBM Think-Pads and technical training, a sample group of agents within the pilot doubled its sales.

Newark, N.J.-based Prudential then initiated one of the nation's largest rollouts of mobile and remote computing. Called LaunchPad, the effort involved providing all 12,000 agents, field management and support staff with customized laptops, instructor-led and computer-based training, technical support and a new infrastructure to undergird the mobile system.

LaunchPad has changed the way Prudential agents conduct business, despite some early skepticism that the laptops would become just expensive paperweights. "All arguments [against mobility] have dropped, and now everyone is asking for more mobility," says Chris Ludwig, vice president of field technology at Prudential.

Now, being ready for the road is all the rage at Prudential — and at other companies, too.

Mobile and remote computing experts agree that the trend is taking off in interesting directions. According to Stamford, Conn.-based Gartner Group Inc., 40% of mobile users will adopt smart phones — wireless phones enhanced with personal digital assistant and Web browsing features — by 2004.

The Wireless Application Protocol will accelerate the adoption of wireless Internet access, creating a mobile-commerce revolution, according to Synchrologic Inc., a developer of Internet-based mobile computing software in Alpharetta, Ga.

This explosion of mobile computing has prompted unexpected career growth for many information technology professionals.

Expanding Skill Sets

As agents became more technical, their questions to the help desk became more complex, says Roy Schwartz, vice president of information systems at Prudential.

To meet the demand, Prudential trained its help desk professionals in security, applications and Internet functions. The company also promoted the help desk director to vice president, commensurate with the expanded responsibilities.

Because of the widespread corporate usage of mobile and remote computing, IT professionals who implement and support it are often thrust into the limelight and gain opportunities for additional training.

At PricewaterhouseCoopers, Colin D. Jones, a global program manager based in the U.K., is leading an international team of 20 IT professionals to create a virtual private network (VPN) for the firm.

Team members are "systems integrations people with good diagnostic abilities and knowledge of networking, firewalls and databases, plus the obvious soft skills of teamwork and problem-solving," says Jones.

The team has rolled out the VPN to the U.S., where approximately 25,000 consultants rely on remote access, logging 1 million hours of connection time in January alone.

"The IT pros who work on the VPN are very visible throughout the firm, and they've earned great street credibility," says Jones.

"Wireless is a hot field for digital and analog engineers who understand microelectronics, radio, multithreading and multiplexing," says Richard Wonder, president of Richard Wonder and Associates Inc., a technical recruiting firm in New York.

He estimates that those with engineering credentials and five years of experience can earn $100,000 or more working for the "bicoastal wireless development companies." ▶

Vitiello is a freelance writer in East Brunswick, N.J.

> Technologists can't get hung up on being elegant. It would be nice to have the perfect technical solution, but most often, we have to be creative in solving the problem through a combination of technologies.
>
> **CHRIS LUDWIG,**
> **VICE PRESIDENT, FIELD TECHNOLOGY,**
> **PRUDENTIAL INSURANCE**

Driving Your Career

"The IT skill sets that make a mobile computing solution rollout successful include process and project management, inventory management and control, the ability to deal with hardware and software vendors, networking and infrastructure expertise, technical support capability, multimedia and distance learning."
– *Barbara Koster, CIO, Individual Financial Services, Operations and Systems, Prudential*

"Anybody who wants to move into the remote and mobile computing market must become familiar with international standards, especially as they affect security and authentication processes. Every firm wants to ensure against hacking."
– *Colin D. Jones, a global program manager, PricewaterhouseCoopers*

"You can't take your eye off the fact that a mobile and remote strategy has to be about delivering business benefits – improving customer service, strengthening relationships, increasing sales [and] making the company more efficient."
– *Roy Schwartz, vice president of information systems, Prudential*

"Like every other technical revolution, wireless is creating a whole new class of occupations. Developing countries prefer wireless technology. Phone systems, computers, television, cable and the Internet are all blending together – soon everything will be mobile."
– *Richard Wonder, president, Richard Wonder and Associates*

So where's the best place to work?

by Carole Hedden

Let's face it. In this labor market, the search for the most talented employees is a quest – most companies are seeking the same people. It's the IT professional's market – if you have the skills, passion and drive being sought.

So there you sit with three or four tremendous job offers. You'll look at them for what they have to offer you – in terms of the cool work you'll do, the kinds of projects and customers, and the types of people with whom you'll be spending your time. Here's a look at just some of the companies we've found who are focusing on these attributes, who are aggressively hiring, and what their information technology leaders think the future will bring.

Amazon.com
Seattle, WA

Being among the leading companies for the next millennium is a simple equation for Rick Dalzell, Amazon.com's CIO. "I'd sum it up as our ability to offer an exciting challenge, to operate in an entirely new space and most importantly one that is extremely customer-focused and values really smart people."

Rick Dalzell, CIO, Amazon.com

Dalzell's view is one of the reasons that Amazon.com was listed in *CIO Magazine's* 100 Leaders for the Next Millennium, August 15, 1999.

"It's really very early in this industry," Dalzell says of online commerce. "The problems we have faced have been so challenging, but there is so much left to do on the table."

The focus at Amazon.com is on how intriguing work can attract and bring people together. "We are about people. The dot-com companies are built on intellectual property and on their ability to hire and keep people who are inventors. Here at Amazon.com, we have a culture that enables individual accomplishment. This is a place where one person can make a difference."

Dalzell says the biggest difference at Amazon.com today versus two years ago is scale and scope. "Customers expect more today. For the first time in history, they can have near perfect information through the Internet. The customers have raised the bar and it will only go higher."

While Dalzell is reticent to site specific projects that are under way, he says the challenges remain. "We're seeing some important trends. The first is that community is very important. We're seeing a movement toward people helping people in a bigger way – that's kind of what the web does. It allows you, in a hypertext kind of way, to connect to anyone," he explains.

A second trend he cites is ubiquitous computing. "It's a real thing – people are going to be tied to their technology all over the world in anything they are doing," he says. "This has a definite impact on how we will build the systems of the future and what we do that makes the customer's life easier."

If Amazon.com could change one thing about its IT operation, it would be to hire more software engineers. "We are only limited by our engineering ingenuity and bandwidth," says Dalzell. "The speed at which our engineering team moves is pretty close to the speed of Amazon.com."

Dalzell says that despite the rapid growth at Amazon.com, the bar for what equates to people talent continuously moves up. "We're looking for smart, analytical people who have a history of delivering," he adds. "I look at resumes for statements that the person delivered a cool piece of technology that enabled something – not 'I worked' on it. I want to be able to see on that resume that you're excited about your work actually being used and that you try to seek out the most challenging problems."

Dalzell has a few tips for IT professionals as they pursue their careers. "Work with people you respect and admire, just as you tried to do in college by choosing a professor who was particularly admired," he says. "You need to work with people you can learn from and who can help you extend who you are. The second thing is to work on things that are meaningful in an environment where you have the autonomy to deliver."

He admits the one mistake he made in his career was staying too long. "There was a period where I went to work somewhere that accepted mediocre work. It drove me out of my mind but it taught me a valuable lesson – don't stay too long where you don't admire or respect the people or the mission."

In his work as CIO at Amazon.com, Dalzell believes his job is to set the course, hire and place people and then set them up to succeed. "The biggest challenge is motivating and inspiring smart people, assuring that they believe what we're doing is meaningful and that they have tough problems to resolve.

"I was a lieutenant in the Army and learned about leadership from a great sergeant. He taught me to learn what people actually do on the job, to respect them, to set clear expectations and to allow them to do their thing," he adds. "That's what I try to do at Amazon.com – let people stretch and not settle for being in comfortable surroundings, to be bold and realize that to do something monumental or different, you have to take risk."

Cabletron Systems
Rochester, NH

Henry Fiallo, formerly head of the technology group at Cabletron

Among the top-selling points for any company is its ability to offer opportunity. Cabletron Systems' recent reorganization creating four independent operating companies has definitely opened the door to still more opportunities. Creating new opportunities is one of the basic factors employees look for when determining their career moves, something reflected in Cabletron's ranking in *Computerworld's* 1999 100 Best Places to work in IT. The new operating companies include:

• Enterasys Networks is focusing on providing e-commerce solutions to Global 2000 enterprise customers.

• Riverstone Networks is providing products and services to the service provider market.

• Global Network Technology Services is a network consulting business, providing design, management and security for complex network systems.

• Aprisma Management Technologies delivers infrastructure management software to its customers.

The plan by Cabletron is for the four operating companies to become four separate, publicly traded companies. "I've been fortunate enough to have managed many outstanding, talented individuals who've accomplished much for the cause," says Henry Fiallo, now the head of Enterasys and formerly head of the technology group at Cabletron. "We've always tried to add responsibility, provide training and career development. This new organization furthers this effort."

Fiallo wants to ensure that as he transitions to leading a start-up company that the IT organization doesn't miss a beat "in terms of helping all four new corporations with their IT-related needs." It's a tall order, but Fiallo believes it's possible if the right people are in place.

"This continues to be a candidate-driven marketplace so we have to get even more proactive about pursuing the passive job seekers who often are the most promising of all," he adds. "I think it's promising too that we're seeing more and more top level business leaders who have worked up through the technical ranks."

As with Amazon.com, Fiallo believes customers and their needs will determine the future. "That's always been more important to Cabletron than dreaming up some exotic new technology fad that doesn't get used. And generally our customers are telling us that it's not time to move beyond ERP and e-business just yet. There's still significant amounts of work to be done to fully integrate with corporate processes."

Fiallo has an advantage many CIOs never face – he is starting over again. "I have the chance to staff Enterasys with many people who worked for me at Cabletron. I want to preserve their talent, their drive, their knowledge, their creativity."

As he looks for new hires, Fiallo says there has been one significant change. "A candidate's formal education – schools and degrees and number of years devoted to that – is a bit less of a key factor. Instead, I'm looking for core values and attributes – their integrity, their creativity, their drive, their curiosity," he explains. "Then I look at their skill set and what they know, but not until then. Skills are learning are almost irrelevant to me if their core attributes don't fit."

Similarly, Fiallo believes the role of the CIO has changed. "The CIO used to be asked to basically create and operate systems," he says. "Now, he or she is asked to lead the way toward improvement, to help formulate strategy, to enable the entire organization and differentiate the company in the marketplace, and to prepare the organization for what can be profound, massive changes."

Cabot Corp.

Boston, MA

Attracting the most talented, smartest people is tough in this market, but it can be even tougher for organizations whose primary mission isn't information technology. Cabot Corp. was named one of *Computerworld's* 1999 100 Best Places to Work in IT, despite the fact that the company is a specialty chemicals manufacturer with annual sales of more than $1.6 billion. "We sell into more than 100 countries and have a physical presence in about 40,"explains Craig Bickel, vice president and CIO.

Craig Bickel, vice president and CIO, Cabot Corp.

This geographic reach is one of the primary reasons Cabot is enticing to IT professionals. The specialty chemicals business itself is technologically advanced. "We basically have turned the company on its side and are becoming more intimate with our customers," says Bickel. "To do so, we undertook a shared services initiative to support a global manufacturing organization and global logistics operation. To make this happen, we need to develop coherent global systems over the top of an extraordinarily diverse set of applications and data."

The result is an intriguing set of technical challenges – from data warehousing to architecture to application development. "The need for these is coupled and creates serious tension as we deal with e-business," adds Bickel. "That's the direction we must move to provide organizational agility, address cost and achieve customer service and performance."

Bickel believes Cabot has been able to attract and keep talented IT professionals because "we've tried to build on integrity, innovation, respect and competitiveness," he says. "Within IT, we've given everyone a piece of the full problems or challenges we face. We're delayered and our jobs are broad. You don't come to Cabot as a programmer or analyst. That may be your area of expertise, but you will use a combination of skills to solve problems here. We don't want you to be limited by your job Instead, we want you to grow into it. We also work with employees to develop career plans and understand their needs. One thing that tells us we are on the right track is that folks who leave tend to come back – they find idea killing, form filling and limited job scopes and then come back here to use their brain and accomplish something good."

Cabot works hard to preserve the innovative and collaborative culture. "There have been moments of truth," Bickel says, pointing to the extensive diversity of cultures and working norms found within Cabot "Because we are not an IT company, our approach, for instance, to e-commerce is 90 percent about commerce and 10 percent about technology. This points to the fact that we have transformed the IT professional at Cabot into a larger business role with more influence on how we sell to, distribute to and manage relationships with our customers."

CDW

Vernon Hills, IL

Autonomy is a key to being among the best IT employers, says James Shanks, CIO at CDW, one of the companies listed in *Computerworld's* 1999 100 Best Places to Work in IT. "We leverage traditional technology, telecommunications and e-commerce in our work as an IT organization supporting a computer retailing business."

James Shanks, CIO, CDW

Shanks discusses IT accomplishments at CDW in business terms of using technology to add value:

• By adding value to the customer relationship with improved functionality, better integration and timely access to accurate information.

• By adding value to the organization from reducing staff and general administration costs, plus supporting improvements in productivity and capacity.

One of the premier initiatives for the company is CDW at Work – an extranet that links customer systems to a customized section of CDW.COM where they can learn about products, availability and pricing.

"As we develop these new ways to facilitate customer interactions, we're seeing an explosion of career opportunities," says Shanks. "There are entirely new positions and opportunities. When I joined the company, we had three people in IT – that was just seven years ago. Today we have 70+ highly trained IT professions who develop our corporate and e-commerce systems. IT at CDW has always been viewed as strategic to the success of our organization and one of our greatest competitive advantages."

Over the past seven years, Shanks and his colleagues have grown a department according to a strong vision of learning and delivering. "We are called upon to make judgments – on whether a technology will add value or benefit to our customers. That's our primary objective."

It's natural then that Shanks looks at resumes for signs of continuous improvement. "We want to see evidence that you've continued to challenge yourself and haven't just been doing the same thing at different places," he says. "There's only so much you can tell from a piece of paper, so I try to get involved with the interviewing process. And for me it comes down to passion and pride. By pride, I mean a strong work ethic and by passion, that you are passionate about technology. In this fast-paced economy, if you aren't passionate it's too easy to burn out."

Shanks also believes that being a top employer means doing things that make sense. "We work hard to keep processes simple, to get rid of the layers of decision-making. My objective is to keep people out of the way so that you can connect the person with the need to the business developer that can build the solution."

Just as important, he adds, is the ability to accept change courses. "We have to have the willingness to continuously assess what we're doing and admit that a strategy may not be exactly correct. We have to take risks and expect to make some mistakes along the way but as long as we learn from those mistakes we have grown stronger as a team. That's one of the key differences between being a help desk and helping build a business."

Shanks has a short list in terms of advice. "If I could have changed one thing about my career, I would have been a better communicator from the start.I'm a farm boy from Iowa and being raised in that environment has had a great influence on me – about keeping things simple, being honest."

Consolidated Stores, Inc.

Columbus, OH

Consolidated Stores is another example of the non-traditional business as major IT player and employer, as evidenced through its listing on *Computerworld's* 1999 100 Best Places to Work in IT. Consolidated's close-out business, in simplest terms, benefits from the errors of others – buying overstock and liquidation items ranging from appliances to food – and then selling them through a network of 1,250 stores that stretches coast to coast.

Steve Bromet, CIO,
Consolidated Stores, Inc.

And while that description is fairly base, the IT infrastructure supporting the operation of Big Lots, Odd Lots and McFrugal's Pic-N-Save is highly complex."We are a growth company, and as a department we tend to do things to support growth," says Steve Bromet, CIO."We treat people as individuals, as we would want to be treated, and our turnover is extremely low."

Bromet says the IT projects range from establishing a uniform systems architecture to develop a data warehousing component that helps the business establish how much of any given item is on hand, and where it is located. "Our ERP system provides information to the specific item, not just the department," says Bromet. "This system has allowed us to improve allocation of merchandise and to know what's selling well and where it's selling."

During the coming year, Bromet says the IT group will also focus on understanding and defining a technology strategy for business-to-business and business-to-consumer systems. "Using what we have already developed and this new strategy, we'll know what merchandise is available, assist in making selections and assure that our purchases make business sense," he explains.

One of the mainstays of Consolidated Stores' attractiveness as an IT employer is its focus on re-skilling employees. "We have built a department that's oriented to solving business problems, and we believe that the technology piece then can take care of itself through training and re-skilling," Bromet says. "We need people who can analyze a situation and successfully resolve it in the best interests of the business. The result may mean that you will be working with a new technology and new learning. That's one of the reasons people choose to stay here."

E-Trade Group, Inc.

Menlo Park, CA

Jeff Ledger, head of product development as a business unit CIO, E-Trade

E-TRADE exemplifies the basics of the new technology economy, and that ability is noted by *CIO Magazine* in naming it one of the IT Leaders for the Next Millennium, August 15, 1999. When asked where the corporate headquarters is located, Jeff Ledger, head of product development as a business unit CIO, laughs, "We have no true corporate office. We're highly decentralized."

Even without the stereotypical headquarters persona, E-TRADE has grown by leaps and bounds over the past year and today is making the financial services it offers broader and deeper. "Within each category of financial service, we want to provide customers with the

tools and products that enable their investing and retirement needs," Ledger explains.

While being new and one of the hot commodities in the e-commerce world, E-TRADE is working hard to also be an employer of choice. "We have a very dynamic environment," says Ledger. "Just as important is that when you work at E-TRADE, you work with some very smart people. When we interview people for positions, we make sure they have the chance to sit with a group of people from E-TRADE. That's when they get a sense of the depth of expertise. It's stimulating and that's the number one factor for most people."

Being among the best employers also rests on the projects under way at E-TRADE. Ledger says an example is the recent completion of real-time account opening. "It used to be that you would sign on for your account on the web, but you still had to print out a form, sign it and fax it in before your account was open. Today you can open the account, file and trade within five minutes. The software to make that possible hadn't even been imagined a few months ago," he says. E-TRADE will continue to develop new applications and systems that distinguish the company. "We're taking every move possible to assure our speed, a balance of building new systems and buying/integrating others."

Ledger says speed and people are the two biggest challenges to remaining at the top of E-TRADE's game. "And we're not talking about number of heads we need to add, but instead of that one person who is the right person. This is a person looking for the next innovation, but who can speak both business and marketing – in addition to technology. This combination is critical to adjust to Internet time."

Once employees join E-TRADE they face the challenge of working in an environment where IT enables every operation. "We work hard to preserve self-empowerment and the thinking that to the risk-takers go the rewards. I look for people who can influence decisions, who can take some heat and rise to it," Ledger adds.

Ledger's not comfortable talking about himself, but he does have one piece of advice to those working in the e-commerce space. "Continuously educate yourself and don't always read and learn about what you know most about," he says. "Read about things that are peripheral to your core knowledge – that's how you increase your overall understanding of systems and people and the way things come together. Doing so helps you come to an answer more quickly than someone who is less aware."

Similarly, Ledger believes his job is not so much technical but more about managing expectations. "Things are so dynamic and changes occur so quickly. In that environment, it's easy for folks to have a different set of expectations about deliverables. Over time, it widens. So my job is really about managing other stakeholders' expectations."

The Gillette Co.

Boston, MA

Pat Zilvitis, CIO, Gillette Co.

Pat Zilvitis, CIO for The Gillette Co., believes that companies that will lead in the future are those that know they "can't take, make or deliver" without information technology. "Information technology's role has grown from that of a passive support function to a capability that is tightly woven throughout the business," he says.

Gillette's approach to using IT as an enabler of business operations was one of the reasons the company was named to *CIO Magazine's* Leaders of the Next Millennium, August 15, 1999. The company's IT network ranges from the 100 Intranet sites to employee kiosks, computerized access to benefits via Intranets, and Extranet programming established for customers and suppliers. "The biggest change for the future is a move to 'web time' where we must change more quickly and use technology ever faster," Zilvitis explains. "At the same time, we must work hard to preserve organizational learning – the incredible pace of change has created incredible knowledge and we must be careful to capture and use it, not reinvent that knowledge every time."

Zilvitis benchmarks how quickly Gillette IT processes can meet business needs against industries and companies throughout the country, using groups such as the Research Board and the company's vendors. "By and large, in the consumer goods marketplace, our ability to design and move products to the market more quickly and the turns of our inventory are critical measures. These two factors have made us early adopters of key technologies that help us stay ahead of the competition," says Zilvitis.

"What's great about working with Gillette's IT organization isn't just the variety of projects where you see improvement immediately," he adds. "Gillette is known as a company of high integrity. That was important to me as integrity was ground into me from an early age. My father was an immigrant who worked hard so his children could achieve. Gillette has that same basic focus on integrity and other core values like excellence in performance. This, combined with aggressive IT technology use, is what makes us a leader in our business."

Zilvitis says he looks for three things when he's considering applicants for Gillette's IT organizations. "First, I look at their interpersonal skills – how they work one on one and one on many with diverse people who have diverse responsibilities. Second, do they understand the business and how different people work together? And finally, what are the technical skills – how broad and how deep?

"You may be brilliant technically, but if you can't express your ideas in business or lay terms, nothing will happen. The people who know business and can apply technology to unique business problems, these are the people who are in demand."

While Gillette looks for this talent, the company is also looking at what it offers employees. Employees in IT are encouraged to move into and out of business areas like marketing, logistics and customer service to gain crucial business skills.

This knowledge sharing is coupled with a focus on just-in-time training that allows employees to gain the skills and capabilities needed, and then put them to work immediately. Gillette University, a virtual campus of online courses and education, was launched internally last year and already has 500 enrollees

And the projects – in addition to the global scaling of more traditional ERP and SAP systems, the company is extending its network with customers and vendors, while improving the IT security systems. "In the coming months we'll continue to work with our customers to identify trends to better serve the end-user – ways that we can help them better serve the consumer."

Schwab Financial Services

San Francisco, CA

Much of the innovation of the online world has occurred in the financial services sector, and there is no financial organization with a more extensive strategy than Schwab Financial Services. This is one of the primary reasons Schwab was listed in 1999 as one of the 100 Best Places to Work in IT by *COMPUTERWORLD.* Fred Matteson, executive vice president of technical services, explains it this way: Schwab is interested in the convergence of customer needs through a variety of media.

"There's a marriage under way between business and information technology," Matteson explains, "and that marriage is closer in the financial services world than anywhere else."

Schwab is known as the largest e-commerce site on the Internet, with literally millions of transactions every day. "We combine it all – from legacy systems and mainframe activity to the latest in web-enabled applications," says Matteson. "There's a sense of balance between creating a sustainable, enduring structure and the excitement of entirely new systems and applications that are testing out before six million customers."

Fred Matteson, executive vice president of technical services, Schwab Financial Services

Schwab has enjoyed 20 percent growth per year, and Matteson is quick to point out "that basically means that there's always new and changing technology projects that are needed to support the company's growth." Matteson believes this growth and the Schwab environment are attractive to a diverse group of people. "We're not all technologists by training," he says. "I am a musician who got involved in electronics in the military. We've found that there are people who have outside experience, brokerage experience and technical experience – that combination works well in keeping our answers to customer needs innovative and making this a good place to work."

Customers are a critical part of the team for Schwab technology employees, says Matteson. "We're constantly surprised by how customers use and adapt what we offer them. We've seen growth in their use rate of more than 1000 percent – that stretches every element of our systems and network. We're working more and more toward infinite computing.

"I think in the future you'll see us working more and more at integrating the various channels by which customers access Schwab – you might be walking down the street and use

your wireless to browse the marketplace, check your account balance and refer to a map that shows you where the nearest Schwab office is located. Call it pervasive computing or whatever, it's the direction we'll be going," he explains.

While the technology, the pace and the sheer magnitude of use by six million customers is enticing, Matteson offers a second view on why Schwab has become an employer of choice. "We are a values based organization that's committed to changing the way people invest and how they view technology."

Staples, Inc.

Framingham, MA

Staples is best known as the warehouse-priced shopping center of office supplies, attracting small and home-based businesses as surely as it attracts major corporate accounts. The company uses technology to attract and keep customers and to provide a one-stop solution and great shopping experience for its customers. Its aggressive approach has won accolades from *CIO Magazine's* Leaders for the Next Millennium, August 15, 1999 and *Computerworld's* 1999 100 Best Places to Work in IT.

Brian Light, executive vice president and CIO, Staples, Inc.

"Our leadership can be boiled down to three critical focal points," says Brian Light, Staples executive vice president and CIO. "We have done a very good job of listening to associations and identifying what is important to them to make this a great place to work. We've worked hard to be the employer of choice in New England and that's only possible by focusing on what people need every day."

This respect for employees is about more than just being nice. "Because we listen to our associates, we've been able to maintain a very fast-paced environment where the technology is dynamic. We've implemented leading edge and high impact initiatives. And finally, we've worked hard at being a well managed team that works on great things and does them well," Light says.

He notes that when he joined Staples, one reason was the high profile role IT plays in the business. "The idea is that we use technology to slash the cost and hassle of running the business. We're working with the business to do great things – and we have a real sense of accomplishment."

The challenges continue, too. Currently Staples is integrating its multiple customer channels (retail stores, catalog business, contract stationer, and e-commerce). "One of the most exciting efforts we'll be furthering in 2000 is leveraging technology across the channels to better serve the customer. Rather than implementing new technologies or programs country by country, we'll implement for Staples' world geography and multiple channels," Light explains.

Light believes that because of the role IT plays in enabling business, more IT professionals will be better positioned to work outside of information technology. "Many of our IT associates have gained a super understanding of the business – and the combination of technical and business skills make them rare contributors who will fill increasingly impactful roles," he says.

The e-business revolution is still in its early stages, Light points out. "It's a big opportunity – not just in how we sell our products and services, but how we run our own business every day. I think we'll only see the pace of change increase. The way we address that is by simplifying where possible," he says. "If you look at our business, we're getting out of the design and build IT mentality and into designing and integrating in the Internet space. Web browser based products are coming out so quickly – we have to be able to couple and decouple them very quickly versus customizing everything. We want to reduce modifications so we can upgrade easily. Simplicity is key."

Organizationally, Light believes the IT group needs to be better at introducing new capabilities to broader group – all associates at all stores, for instance, instead of limited groups. "IT organizations used to develop systems for a small, dedicated user community. Today, we're delivering technology to be used by potentially our entire workforce – or directly by our customers! Usability is critical. If we simplify, even by just a few seconds, a technology based process – you multiply that by 50,000 associates and it adds up to real money, increased use and less frustration," he explains.

As a fast-growing company, Staples wants to preserve the energy and passion for its business. "We don't worry so much about traditional evaluation criteria," Light says. "The resume and skills listed aren't as important as behavior. Tell me about a time you had to solve a problem quickly – what did you do? Tell me about a time you worked on a team and you disagreed with the team leader – what happened? "And we're interested in people who understand and work closely with the user community – what are the benefits of what you create for them? Can you talk about the benefits in business terms instead of in technology terms?"

SENIOR SOFTWARE ENGINEER:
High level design of architecture for Web-based medical information systems. Design of medical data models and their implementation in an object-oriented language. Design of schema required to store medical data. Design of systems for computerized representation of medical knowledge. Design subsystems to ensure privacy of medical data. Will be involved in system deployment. Responsibilities include assessing client requirements and analyzing workflow issues. Requires: M.S. in Medical Informatics with 1 year experience in developing Web-based medical information systems. Knowledge of Object-oriented design, Java, C/C++, Perl, RDBMS including Oracle and Microsoft SOL Server, UNIX and Windows NT. Ability in cryptographic and authentication protocols. 40 hrs/wk (9 to 5); $75,000/yr. Send two resumes/responses to Case No. 19990796, Box 8968, Boston, MA 02114.

Unicom, Inc. is a professional software consulting firm providing services throughout the United States. We are seeking to fill multiple full-time positions for Software Engineers to design, develop, plan and test computer programs. Software Engineer positions require a minimum of a Bachelor of Science in Comp. Sci., eng. rel. field or equiv., and 1-5 years of experience (depending on position) in one or more of the following skills:

Databases
Oracle, Developer 2000, SOL, Powerbuilder, Informix

Mainframes
CICS, Cobol

Languages & environments
C, Java, C++, Visual Basic, Visual C++, IMS, Object Views, Unix, Windows.

Please mail resume to: Human Resources, Unicom, Inc., 2 Lucy French Way, Ashland, MA 01721, or fax to: (508) 881-2410.

Software Engineer. Lead a team of software engineers in the design, development, customization testing debugging of application software development projects in Sybase database administration using Sybase System 10 or 11Db Lib/C, and TSOL in UNIX environment. Requirements: Master's degree in Computer Science, Math, Electrical Engineering, Mechanical Engineering, or related field, plus one year in related occupation of: Software Engineer, Programmer, Analyst or related tech occupation. One year related occupation experience must include leading a team of software engineers in the design and development of software application projects in Sybase database administration using Sybase System 10 or 11Db Lib/C, and TSOL in Unix environment. Salary: $76,500, 8am-5pm, 40 hrs/wk, M-F. Applicants should respond to Case # 19983356, P.O. Box 8968, Boston, MA 02114. Applicants should submit two copies of his/her resume in response.

SENIOR SOFTWARE ENGINEER: Will design, implement, test, and support specific networking test tools, individually and as part of a team. Must also maintain documentation. Will be responsible for writing codes and User Interface for network test tools using TCP/IP. Will program in C, C++, and Shell Scripts on the Windows NT and UNIX platforms. Will be extensively invoved in client-server methodologies, interprocess communication and GUI development on the UNIX platform. Requires M.S. in Computer Science and 1 year experience in Client Server programming. 40 hrs/ wk (8 to 5); $73,500/yr. Send two resumes/responses to Case No. 19990090, Box 8968, Boston, MA 02114

Technical Team Leader- Develop a strategic plan to advance the location in targeted technologies, participate and guide others in completion of the implementation phase of a client engagement, manage team resources in a manner that promotes maximum utilization of team skills and capabilities with emphasis of target deliverable dates, and enhance the knowledge of junior staff members. Responsible for program coding and environment set up/control, and performing code reviews and regression testing of team members work. Implementation of Application Packages (Oracle Financials) and perform Database administration work including Installation, Performance Tuning, Customize database Triggers and reports, Backup and Recovery. Requirements include a Master's Degree or equivalent in Computer Science or related field and at least three years of experience in the job offered in the related field of ORACLE or a Bachelor's Degree and five years of progressively responsible experience. Strong background in Database administration. Applicants must have unrestricted authorization to work in the United States. Salary $93,000/year. 40 hours/wk. Respond with two copies of resume to Case # 19983353, P.O. Box 8968, Boston, MA 02114.

Senior Software Developer/Engineer to serve as part of a team responsible for transitioning a department from legacy applications to client/server based applications. Participate in evaluation and selection of development tools, and provide technical leadership in deployment of major business applications. Evaluate user requirements and design client/server compliance systems with IBM A/S 400 database and Powerbuilder graphical user interface (GUI). Also perform end-user training and other software development and testing functions as required. Requires Bachelor of Science Degree in Computer Science, Electrical Engineering or Electronics and two (2) years experience in job offered or two (2) years experience developing client/server applications. Candidate must also possess demonstrated expertise developing online financial transaction processing and reporting systems; demonstrated expertise developing GUIs using Powerbuilder; and demonstrated expertise in performance tuning SOL statements and writing stored procedures. Salary: $59,500/yr; Mon-Fri, 9:00AM-5:00PM. Send resumes to: Case Number 19990361, P.O. Box 8968, Boston, MA 02114. EOE. Applicants must be U.S. workers eligible to accept employment in the United States on a full-time basis.

Senior Programmer for Human Resources Applications wanted to create & maintain survey databases; develop database testing & processing procedures; integrate client administered & internally administered databases; automate quality control procedures for organizational & individual survey feedback reports; develop data validation & testing methodologies; conduct statistical analyses of survey data; design & select appropriate statistical analysis procedures; design Internet-based surveys; automate survey data collection & processing; design survey feedback reports from databases; provide directions & guidance to junior programmers; train survey coordinators & consultants on survey tools, processes & capabilities. Must have Master's Deg. in Quant. Methods or related field, 3 yrs. exper. in database & application develop., incl. experience with Microsoft Access & incl. experience with Visual Basic Apps., statistical software (e.g., SPSS, SAS, SHAZAM), & large-scale data base design & analysis, & proficiency in Structured Ouery Language (SOL). Salary $59,005/yr. Send 2 resumes to Case# 19984048, PO Box 8968, Boston, MA 02114.

Software Engineer (Boca Raton, FL). Develop and analyze process formulations for metrology in semiconductor manufacturing. Define requirements and specifications for standard processing through the use of statistics, algorithms, and software. Review product requirements to ensure compatibility of inline process measurements. Recommend and prepare changes, additions, and modifications to facilitate more efficient manufacturing of semiconductors. Bachelors in Eng'g and 2 yrs. exp. in job offered or Process Engineering req'd. 2 yrs. exp. must include metrology equipment set-up and implementation specifically probe and transmission microscopes; numeral and statistical analysis, modeling, and software development in semiconductor processes and manufacturing. 40 hrs/wk, 9am-5pm. $64,600/yr. Send resume to Dept. of Labor/Bureau of Workforce Program Support, P.O. Box 10869, Tallahassee, FL 32302. JO FL2059038.

MJ Technologies of NJ, Inc. is seeking experienced professionals with the following skills:

• Real Time Embedded, pSOS+, VxWorks, OSE, ISDN, ATM, SONET, VoIP/VoATM, SNMP.

• HTML, Corba, Perl, CGI, RMI, IIS, MTS, KIVA.

• Oracle, Sybase, Corba, VC++, MFC with COM/DCOM, SOL, VB, ActiveX, PB, C, C++ on Unix/NT.

• HP-UX, Sun Solaris, Linux, AIX, Networking, Win-NT, DB2, UDB, Oracle, Sybase, Informix, SOL Server Administrators.

• Datawarehousing and ERP having ORACLE Financials, PeopleSoft, CRM, Baan.

We provide a very competitive salary and benefits package and is an EOE.

Please respond to: HR Dept., MJ Technologies of NJ, Inc 762 Green St., Ste 2C, Iselin, NJ 08830 Tel: (732)855-1194 Fax: (732)855-7911 Email: hrdept@mjtnj.com

TBR, Inc. has multiple positions open for Analyst/Programmer consulting throughout the U.S. Requires Bachelors degree and 2 years experience in Cool:2E (Synon/2E) and Cool: Plex (Obsydian). Must be willing to travel and /or relocate to various client locations to work on site throughout the U.S. Please fax your resume to 904-733-1717.

SYSTEMS ANALYST. Analyzes user requirements, procedures and problems to automate processing or to improve existing computer systems. Bachelor of Science in computer science, engineering, or math-related and two years' experience in job offered or as software engineer required. Must be able to travel. Two years' experience C, C++, Visual Basic, Power Builder, MFC, Com, ODBC API, COM 32 SDK, ORACLE, Watcom, SOL, Windows NT & 95. $62,920/yr.

Interested applicants send two resumes to Georgia Department of Labor, Job Order No. GA 6482653, 2943 N Druid Hills Road, Atlanta, Georgia 30329 or the nearest Department of Labor Field Service Office.

Trustek, Inc. Consulting firm is seeking Software Engineers w/MS and min. 1 yr. exp. or equivalent or Progg. Analyst w/BS deg. & 2 yrs. exp. Traveling/Relocation will be required anywhere in U.S.A.

• C, C++, Windows/NT, Informix/7.1, CGI Scripts, Sybase
• Perl, HotMetal Pro., MS SOL, Web Pages, E-Commerce
• Lotus Notes, Lotus Script, Domino Server, Java, Java Script
• HTML, Oracle, Developer 2000, RDBMS, Corba
• Y2K Comp., Forms 4.0, Reports 2.5, Crystal Reports
• DBA, ASPS, Visual Basic, Web Design/developer
• ABRAXAS, SIEBEL (Sales & Call Center) SIEBEL VB
• DHTML, JDK Swing, Visual J++, Jbuilder, Visual Cafe
• SAP R/3, HP-UX, SUN OS, Solaris, Cold Fusion, Broad Vision,
• Silver Stream, Clarify, WebLogic, WebSphere, Java WebSphere, Linux,
• EJB, Servlets, Applets, JSP, COM, DCOM, DML, UML, Relational Rose,
• Oracle Financials, ABAP/4, PL/SOL, MS SOL Server, Sybase, SOL.

The applicant should also have exp. in: interface w/hardware & software, provide functional cust. Implement, config., train, analyze, interpret, code, test, backup, install, manage, customize, tuning, perform AS-IS study, of software. Dev. Internet/Intranet appl., stored procedures, triggers. Create: database tools, tables, files, roles, indexes, space mgt, re-organize & sec. Asp., Web, pages.

Apply w/resume to
Attn: Recruiter
860 U.S. Route I.N #4
Edison, NJ 08817.

Senior Programmer. Must have BS in Computer Science, Mathematics or Engineering and one year of recent experience in UNIFY Database, SOL and RPT as well as documented knowledge of C, FORTRAN, PASCAL as well as web development using HTML. The position cal is for the building and maintenance of applications over the underlying UNIFY DB as well as the manipulation of text files to design format using C or other programming languages with a V1 editor as well as writing shell scripts. "Must be conversant with the working of mailorder catalog companies in terms of offers, media codes and offer-driven pricing." The position requires excellent communication and report writing skills as well as the ability to provide status reports to clients and supervisor along with daily maintenance of database applications. The Senior Programmer will also coordinate the activities of other programmers including the delegation of assignments, supervision of their performance, training of new programmers, maintaining work logs and reporting to VIP on these duties. Candidate should provide samples of report writing skills. Must be willing to travel. Salary range from $30,000 to $45,000 depending on experience. Must have legal authorization to work in the United States, 40 hour per week. Send resumes to Chet Stahl, 1776 Peachtree Street, 200 North, Atlanta, Georgia 30309. No phone calls please.

Director of Software Development to develop financial and customer information systems in Windows 95, UNIX, client/server, and Intranet and Internet environments. Design, implement, and maintain customer account information and market data systems, both web-based and traditional client/server model. Design, implement, and maintain backend connections into Sybase database from legacy systems. Use Sun Spareworks C++ and Visual C++, Sybase Transact-SQL and Java (1.0.2 and 1.1.6). Requires Bachelor of Science Degree in Computer Science, Electrical Engineering or Mathematics and five (5) years experience in job offered or five (5) years experience developing applications in a client/server environment OR seven (7) years experience in job offered or seven (7) years developing applications in a client/server environment. Candidate must also possess demonstrated expertise developing applications using object-oriented (OO) methodologies; demonstrated expertise in design, development, and implementation of web-based applications using C++; and demonstrated expertise developing applications using Sybase or Oracle. Salary: $90,200/yr; Mon-Fri, 9:00AM-5:00PM. Send resumes to: Case Number 19990061, P.O. Box 8968, Boston, MA 02114. EOE. Applicants must be U.S. workers eligible to accept employment in the United States on a full-time basis.

Director of MIS: Manage Information Systems (IS) department, including resource and budget management, personnel management, system analysis and business processes definition. Perform daily maintenance on and provide user support for Mfg/Pro Enterprise Resource Planning system. Evaluate, negotiate, purchase and mange acquisition of new software and equipment. Develop and revise Information Systems strategy planning. Maintain and support Progress databases using Progress and fourth generation languages under UNIX, including database administration, security management, version control and upgrades, and performance monitoring. Create IS policies and procedures. Prepare managerial reports and data analysis tools for use by management. 40 hrs/wk, $85184.60-120,000 / yr. Requires Bachelor's degree in Computer Science, Industrial Management or IT Management, 4 years experience in Information Systems project management that includes 2 years implementing and supporting Mfg/Pro System. Demonstrated knowledge of Progress database administration, fourth generation languages, and UNIX. 10%-20% travel required. Must be US citizen, permanent or lawful temporary resident, refugee or asylee. Send 2 resumes to Job Order 19983996 P.O. Box 8968, Boston MA 02114.

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Systems and Remote Administrator to administer, design, implement, maintain and provide technical support for multi platform devices with operating systems such as Windows 95, NT (versions 3.51 and 4.0) and Mac OS. Maintain and troubleshoot software and hardware for PC and Apple Macintosh computers. Administer, diagnose and setup complex remote access using ISDN, PPP, RAS, TCP/IP, AppleTalk, DHCP, WINS and DNS servers for Windows NT server and integrated system for end-users inside or outside office in one-user-one-account feature. Communicate with users to diagnose problems by phone. Analyze, research and propose new emerging technology functionality ensuring company's competitive advantage while minimizing costs and improving employee efficiency, implementations and rollouts of new products training, and other projects. Install and maintain hard drives, CD-ROM technologies, modems, Livingston Portmaster, printers, memory modules and other peripherals. Perform systems analysis and improvements. Provide technical information, tips and techniques, FAQ and work around to support via web page. Assist in project management of new client installations. Requires Bachelors of Science Degree in Electrical Engineering or Computer Science and two (2) years experience in job offered or two (2) years experience in systems support or systems administration. Candidate must also possess demonstrated expertise administering Remote Access users using LAN protocols; demonstrated expertise analyzing, testing, and troubleshooting hardware and software within Mac and PC environments; demonstrated expertise configuring and troubleshooting LANs using TCP/IP suite and AppleTalk; and demonstrated expertise configuring and troubleshooting E-mail systems using POP3, IMAP clients and SMTP. Salary: $50,428/yr; Mon-Fri, 9:00AM-5:00PM. Submit two (2) copies of resume to: Case Number 19983056, P.O. Box 8968, Boston, MA 02114. EOE. Applicants must be U.S. workers eligible to accept employment in the United States on a full-time basis.

Unique Computing Inc., is a high-growth software development and consulting organization engaged in architecting, designing, developing, deploying and managing multi-tiered applications using state-of-the-art technologies and tools. In order to staff a number of projects at various stages in the development cycle, we are seeking to hire software engineers, developers, architects, analysts and administrators with experience in one or more of the following areas.

Development Languages/Environments: C++, Visual C++, Visual Basic, PowerBuilder, HTML, Java Script, ASP, Java, AWT, Developer 2000, Lotus Notes.

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Web Servers: IIS, Apache, Netscape Application Server, Oracle Web Server, Domino

Databases: Oracle, Sybase, SOL Server, DB2

Operating Systems: Windows NT, Unix, Linux

To be considered for a position, the candidate must have at least a bachelor's degree or equivalent in computer science, engineering, mathematics or a related field, and 1-5 years of work experience

Compensation packages are designed to attract and retain the best talent. Send resume to: Human Resources, Unique Computing, Inc. 1661 Worcester Road, Framingham, MA 01701, or fax to (508) 598-6101, or e-mail to: hr@uniquecomputing.com

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QUALITY CONTROL ENGINEER

needed to analyze, develop, document and supervise quality control in manufacturing production process including troubleshooting of Windows NT networking hardware/software and maintenance of ISO quality standards and formal engineering practices; to use SPC techniques and C programming. Master's required in Industrial Engineering or Engineering Management or any related field, plus one year of experience. Must have proof of legal authority to work in the U.S.

Salary: $50,000.00/year for a 40 hour work week.

Send resume to Bernard Childerston, Nebraska Job Service, 550 S. 16th St., P.O. Box 94600, Lincoln, NE 68509. Refer to Job Order #NE 0265120. Ad paid by an Equal Opportunity Employer.

Programmer Analyst needed for software development & consulting firm in Duluth, GA. Job duties include software consulting on various in-house projects and/or contract basis. Design, develop & re-engineer a variety of computer applications using state-of-the-art tools & techniques. Use Powerbuilder, Oracle, Sybase & MS ACCESS. Applicant must have Bachelor's Degree in Computer Science, Applied Science, Engineering or Math & 2 yrs. exp. as a Programmer Analyst in the job duties described abv. or 2 yrs. exp. designing & developing computer applications using Powerbuilder, Oracle & Sybase. 40 hrs/wk, 8:00am-5:00pm Mon-Fri; $62,920/yr. Apply in person or send 2 resumes to Georgia Dept. of Labor, Job Order # GA6473654, 1535 Atkinson Rd. Lawrenceville GA 30043-5601 or the nearest Dept. of Labor Field Service Office.

Software Engineer to design, develop, test, implement and maintain EDI, SD, MM, FI and Transportation modules on client/server, Unisys, VAX and PDP 11 platforms using SAP R/3, ABAP/4, LINC, XGEN, DM-SII and COBOL. Require: Bachelor's degree (or equivalent) in Computer Science, Engineering, Physics, Mathematics, or a closely related field, with one year of experience in the job offered or as a Systems Analyst. Three years of college/university education with an additional three years of experience in the field will be considered equivalent to the Bachelor's degree. Extensive travel on assignments to various client sites within the U.S. is required. Salary: $75,000 per year, 8 am to 5 pm, M-F. Send resume to: George Kulangara, President, Softron Systems, Inc., 5826 New Territory Blvd., Suite 112, Sugar Land, TX 77450; Attn: Job RR.

SENIOR SOFTWARE ENGINEER

required. Design, program and implement system level processes to enable communications between Windows NT based Servers and UNIX based applications as a consultant to the telecommunications industry.

Masters degree required in Math, Computers, Engineering or any related field of study plus three years of experience in the job duties described above. Must have legal proof to work in the U.S.

Salary: $55.00 per hour for a 40 hour work week.

Interested applicants please submit two (2) copies of his/her resume to Case #19990009, P.O. Box 8968, Boston, MA 02114. Ad paid by an Equal Opportunity Employer.

SOFTWARE ENGINEER to develop, test, implement, and integrate software applications using the Rational Unified Software Process (RUP) and object oriented techniques, C++, Orbix, CORBA, xdb, dbx, Rational Rose, Rogue Wave, Sun Workshop, Java, JDK, Symantec Visual Cafe, Shell Scripts, Visual Source Safe, UML, Netscape Application Server, and TCP/IP under Windows, UNIX, and Sun OS operating systems. Require: M.S. in Computer Science, an Engineering discipline, or a closely related field, with one year of experience in the job offered; Extensive travel on assignment to various client sites within the U.S. is required. Salary: $68,000 per year, 8 am to 5 pm, M-F. Send resume to: Roz L. Alford, Principal, A.S.A.P. Staffing, LLC, 3885 Holcomb Bridge Road, Norcross, GA 30092. Attn: Job SP

SOFTWARE ENGINEER to design, develop, test, implement, maintain and support GUI-based and client/server based software for various applications using object oriented technology, Java, Java Server Pages, Java Servlets, RMI, C, C++, CORBA, Oracle, Visual Cafe, and Rational Rose on Windows and UNIX operating systems. Require: M.S. degree in Computer Science, or a closely related field; Must have a demonstrated ability to perform stated duties gained through previous work experience/academic coursework and projects; Extensive travel on assignment to various client sites within the U.S. is required. Salary: $68,000 per year, 8:00 am to 5:00 pm, M-F. Send resume to: Eduardo Santos, President, Custom Software Solutions, Inc., 4025 Leeambur Court, Liburn, GA 30047; Attn: Job DV

CO#: MD 9683935- DBA's to design & develop database app's using Oracle 7.x on UNIX, VAX/VMS & Windows 95/NT OS; perform full range of app's & DB systems development duties using Designer/2000, Developer/2000 app tools on a variety of projects as assigned; design, develop, code, implement, debug, optimize using SOL *PLUS 3.2, P1/SQL 2.2, Oracle Forms 4.5; provide user support & user documentation for the app's & systems under development using Crystal Reports 5.0 & Oracle Reports 2.5; design & development of UNIX scripts to transfer data across MS Access 97, Visual Basic & UNIX using C, C++.

Sa. @ $64,000/yr.; 40 hr/wk; 8:00am-5:00pm; Req's MS in Comp. Sci. & travel.

Mail two copies of resume & copy of this ad to: Department of Labor, Licensing & Regulation, 1100 North Eutaw Street, RM #201, Baltimore, MD 21201. Job Location: Hanover, MD & Multiple Sites in the U.S.

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Software Engineers

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EOE

Programmer/Analyst to design and develop low level Win32 system and network software that test and debug computer and hardware problems using C, winsock, threads, mutex and semaphore; Perform NT video driver programming, RS232C serial port programming and BaseIO interfacing. Require: M.S. degree in Computer/ Electrical Engineering with a demonstrated ability to perform the stated duties gained through previous work experience/academic coursework. Must have completed one graduated/ undergraduate course each in computer networking, engineering, operating systems and system software. Salary: $60,000 per year, 9 am to 6 pm, M-F. Apply in person or by resume to: Georgia Department of Labor, Job Order #GA 6487127, 2943 N. Druid Hills Rd., Atlanta, GA 30329 or the nearest Department of Labor Field Service Office.

Applications/System Architects: Positions available in our New York, Chicago and San Francisco area offices. Will work with exceptional teams of computer and business professionals participating in full life-cycle development of distributed, object-oriented applications. Will design, develop and implement enterprise wide, distributed applications in various OO, client/server, n-tier environments against various relational databases. Will utilize OO languages, including Forte and Java and relational databases such as Informix, Oracle, Sybase, MS SOL Server, and DB2. Will lead development teams. Requirements: Bachelor's degree in Computer Science, Computer Engineering or Electrical Engineering or equivalent, plus five years of experience, which must include experience in programming with an object-oriented programming language; or Master of Science degree in Computer Science, Computer Engineering or Electrical Engineering, or equivalent. If interested, please email your resume and cover letter to jobs@thoughtworks.com.

Manager

Sr. Account Manager

Manage sales activities for programmable switching product for the telecommunications industry including penetration of emerging US markets; manage sales support activities including pre and post sales technical support; select, train and recommend compensation for staff members. Knowledge of Telecommunications industry and voice processing market; US telecommunications architecture and enhanced services applications. Bachelor's degree or foreign equivalent in Business Administration and 5 years experience in Account Management Telecommunication Sales. Monday-Friday, 9:00am-5:00pm, 40 hrs/wk, $65,000. Send 2 copies of resume to case #19990058, P.O. Box 8968, Boston, MA 02114.

Software Engineer to design, develop, test, implement, maintain and support customized software systems using object-oriented programming techniques, C, COBOL, DecMessageO, ACMS with Decforms, Dec Scheduler, VAX/Rdb, Ingres and Oracle under MS Windows, VAX/Open VMS and Alpha/Open VMS platforms. Require: B.S. degree in Computer Science/Engineering with two years experience in the job offered; Extensive paid travel on assignments to various client sites within the US. Salary: $65,000 per year, 9 am to 6pm, M-F. Apply by resume to: Georgia Department fo Labor, Job Order #GA 6486482, 1535 Atkinson Rd., Lawrenceville, GA 30043-5601 or the nearest Department of Labor Field Service Office.

Systems Administrator

(Miami, FL) Configure hardware & software in computer network integrating operations in Miami, NYC & Chile; define user access; maintain; troubleshoot. Work in AS/400, Lotus Notes, Windows NT, TCP/IP environ. Bachs/Comp Sci or Engg or Math or MIS. 2yrs/exp. in job offered or 2yrs as Programmer/ Analyst. Must have indepth working knowledge of AS/400, Lotus Notes, Windows NT, TCP/IP. Must be fluent in Spanish. 40hrs/wk (9am-6pm; M-F) $35,000/yr. Send resume to: Dept. of Labor/Bureau of Workforce Program Support, P.O. Box 10869, Tallahassee, FL 32302. Re: JO#FL-2052347.

ANALYST PROGRAMMERS

required. Design, program, install and test application interfaces on Windows/ Windows NT platforms using Visual C++.

Three years of experience required in the job duties described above. Must have legal authority to work in the U.S.

Salary: $70,000/year for a 40 hour work week.

Interested applicants please submit two (2) copies of his/her resume to Case #19983745, P.O. Box 8968, Boston, MA 02114. Ad paid by an Equal Opportunity Employer.

Sales Engineer, Sr.- (Co. loc in Burlington, MA & client sites in Michigan, Tennessee, Minnesota, NY & Nebraska) Provide pre & post sales advance level support services regarding high technology services & products; develop sophisticated marketing plans for Internet; serve as senior liaison between Co. & clients technical staff. Masters in engg, math or computer sci. reqd. Will accept 2yrs/exp. in software development in lieu of bachelors deg. 2yrs/exp. in job offered. Knowledge of Internet. Must be willing to spend up to 50% of time traveling to Midwest & Southeast USA. 40hrs/wk (9-6; Mon.-Fri); $68,885/yr. Send resume in dupl. to Case #19983604, PO Box #8968, Boston, MA 02114.

Business Analysts: Positions available in our New York, Chicago and San Francisco area offices. Will work as team leaders with exceptional teams of computer and business professionals participating in full lifecycle development of distributed, object-oriented applications. Will apply OO analysis and design methodologies and object modeling techniques to design OO applications. Will be responsible for working with users to define system requirements. Will translate those requirements into clear and precise specifications for the developers to implements. Will design screens, write use cases, design and perform system testing. Requirements: Master's degree in Business, Computer Information Systems or related field, or equivalent. If interested, please email your resume and cover letter to jobs@thoughtworks.com.

Software Engineer. Design and develop software packages using Oracle and SOR. Demonstrated ability using SOR tools for reports and data loading. Demonstrated ability developing software using GUI based Developer 2000 tools. $60,000/yr. 40 hr/wk. 9 a.m. - 5 p.m. Must have 2 yrs. exp. (or 2 yrs. Exp in related occupation of Programmer Analyst) and B.S. in Comp. Sci., eng. rel. field/equiv. Send 2 resumes: Case #19990195, P.O. Box 8968, Boston, MA 02114

Software Engineer: Atlanta opening to design and develop online analytical applications and datawarehouse projects using Designer 2000 & Developer 2000, Java, C, PL/SOL, PERL, SOR & HTML. Analyze, design and develop relational and Multi-Dimensional Databases. Provide technical solutions and recommend appropriate Hardware/Software based on user requirements. Also responsible for load testing applications with appropriate software. Req. MS in CS, CE, EE or other engineering discipline plus at least one year work exp. $66k/yr. Resume to: HR Manager, SoftTech, Inc. 8282 Western Way Circle, Ste 1110, Jacksonville, FL 32256.

SENIOR PROGRAMMER/ ANALYST to analyze, design, develop, test, implement and maintain application software systems for business applications using PowerBuilder, Oracle, MS SQL Server, Sybase, DB2, Sybase SOL Anywhere, ERWin, Power Designer, RoboHelp and SQA Suite. Require: B.S. degree in Computer Science, or a closely related field, with two years of experience in the job offered or as a Programmer/Analyst. Extensive travel on assignments to various client sites within the U.S. is required. Salary: $66,000 per year, 8 am to 5 pm, M-F. Send resume to: John Watson, Sr. VP, Corp. Relations, IMA Plus, 9428 Baymeadows Rd., Suite 500, Jacksonville, FL 32256; Attn: Job ET

Project Manager- (Burlington, MA) Analyze systems/ project/software requirements; make recommendations based upon ISO 9000 model, Y2K technology tools, bull mainframes; manage projects; oversee software implementation. Masters/ Economics, Business or Mngmt. 3yrs/exp. in job offered. 40hrs/wk (9-6; Mon.-Fri); $79,515/yr. Send resume in dupl. to Case #19983557, PO Box #8968, Boston, MA 02114.

Computer. Multiple openings available for IT Professionals. Develop and design s/w systems using various h/w, operating system tools, software packages and languages; develop client/ server, mainframe, midrange, ERP and web applications. A degree is required. We will accept the foreign equivalent of the required education and/or its equivalent in education and experience. Candidates with experience will be given special consideration. Competitive salaries offered. Please forward resumes to: Strategic Staffing Solutions, Attn: KC, 3011 W. Grand Blvd., Ste 1415, Detroit, MI 48202. EOE

Database Administrator - (Lexington, MA) Undertake database administration using major RDBMS; write parallel, C, Java programs; provide technical support for systems admin. Bachs/Comp Sci. or Engg or Math. 4yrs/exp. in job offered. 40hrs/wk (9-6; Mon.-Fri); $70,000/yr. Send resume in dupl. to Case #19990498, PO Box #8968, Boston, MA 02114.

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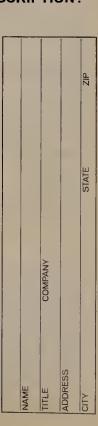
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GAINERS ⬆   LOSERS ⬇

PERCENT

GAINERS		LOSERS	
Gartner Group	45.4	PSINet Inc.	-22.1
Cognos Inc. (H)	29.4	Hyperion Software	-19.6
TenFold Corp. (H)	23.6	Tricord Systems	-19.3
Adobe Systems Inc. (H)	21.5	Open Market Inc.	-15.9
Cisco Systems Inc. (H)	18.4	Transaction Sys. Architects	-15.4
Analog Devices (H)	17.9	Prodigy Communications	-14.7
Manugistics Group Inc. (H)	17.2	Checkfree	-14.7
American Power Conversion (H)	16.9		

DOLLAR

GAINERS		LOSERS	
eBay Inc. (H)	30.75	Businesss Objects S.A.	-18.25
Nokia Corp.	26.44	Quest Software	-15.03
Yahoo Inc.	20.13	NEC (H)	-12.31
Adobe Systems Inc. (H)	19.19	PSINet Inc.	-11.00
Juniper Networks Inc.	18.38	Ariba Inc.	-10.88
SGS-Thomson Microelectronics	18.38	Checkfree	-10.69
Cognos Inc. (H)	18.25	Hyperion Software	-8.56
Microsoft Corp.	16.25	Procom Tech Inc.	-7.75

New SEC Rules Knock Data Mining Highflier

BY JULEKHA DASH

THREE MONTHS after their release, the SEC's new accounting guidelines have taken their toll on the share price of at least one new economy company.

Data mining firm MicroStrategy Inc. [Nasdaq:MSTR] in Vienna, Va., saw its stock price plunge 62% on March 20, from $226 to $86.75 per share. The drop came after MicroStrategy's CEO lowered the firm's revenue statements for 1998 and 1999, in an effort to comply with the new Securities and Exchange Commission (SEC) guidelines.

The announcement prompted several class-action lawsuits on behalf of investors.

The change reflects the firm's shift in the way it accounts for revenue from service contracts — recording them during the period of the contract rather than up front.

The company is expected to report a loss of $34 million to $40.3 million for last year, rather than a profit of $12.6 million. For 1998, the company's reported revenue could dip from $106 million to between $96 million and $101 million.

MicroStrategy "is fundamentally still the same company, but will [the news] hamper its ability to get new customers and execute? That's the $64,000 question," said Steve Abrahamson, an analyst at the Prudential Volpe Technology Group in San Francisco.

Other companies — and their auditors — may learn from MicroStrategy to be more conservative in how they account for multiyear contracts that include both software licenses and services, said Abrahamson. MicroStrategy uses the accounting services of New York-based PricewaterhouseCoopers.

The SEC's guidelines — which state that companies must have actually delivered a product or service before claiming revenue — really just reinforce existing accounting principles. But the SEC issued them after a review revealed that some new economy firms weren't following these guidelines.

Jon Moody, an analyst at BB&T Capital Markets in Richmond, Va., said he's confident of MicroStrategy's long-term outlook. The company simply "restated revenues based on timing," he said. "It doesn't affect the overall money coming into the company."

Apparently investors felt some renewed confidence in the firm as well. After sliding further last Tuesday, the stock edged up 16 points on Wednesday, closing at about $88 per share. ▶

INDUSTRY ALMANAC

MicroStrategy Inc.
Last week's stock prices:

■ OPEN   ■ CLOSE

	3/20	3/21	3/22
OPEN	$226.00	$86.75	$72.31
CLOSE	$86.75	$72.31	$88.72

EXCH	52-WEEK RANGE		MARCH 24 2 PM	WK NET CHANGE	WK PCT CHANGE
SOFTWARE UP 1.7%					
ASWX	149.12	11.00	Active Software (H)	108.00	-30.88	-22.2
AOBE	109.56	18.84	Adobe Systems Inc. (H)	108.25	19.19	21.5
ARBA	366.68	30.50	Ariba Inc.	258.75	-10.88	-4.0
AZPN	55.37	8.12	Aspen Technology Inc.	46.25	0.00	0.0
AOSK	56.06	17.00	Autodesk Inc.	50.25	2.31	4.8
AVID	32.37	9.43	Avid Technology	21.13	0.13	0.6
BMCS	86.62	30.00	BMC Software Inc.	52.94	-1.44	-2.6
BOBJ	150.87	8.18	Businesss Objects S.A.	110.00	-18.25	-14.2
CDN	27.87	9.18	Cadence Design Systems	23.31	0.19	0.8
CBTSY	60.87	8.56	CBT Group Plc.	50.00	-2.63	-5.0
CHKP	295.00	11.50	Checkpoint Software Tech.	227.25	-7.75	-3.3
CTXS	122.31	13.25	Citrix Systems Inc.	99.94	2.94	3.0
COGN	81.00	19.37	Cognos Inc. (H)	80.25	18.25	29.4
CA	79.43	32.12	Computer Associates Int'l. Inc.	65.63	1.06	1.6
CPWR	40.00	16.37	Compuware Corp.	24.19	-0.38	-1.5
DCTM	106.00	9.37	Documentum	79.81	-1.19	-1.5
EFII	66.37	33.06	Electronics For Imaging (H)	65.19	7.63	13.2
HNCS	130.00	13.75	Hnc Software	108.06	7.56	7.5
HYSL	65.00	9.87	Hyperion Software	35.19	-8.56	-19.6
IOXC	49.12	12.43	IOX Systems	30.31	-0.06	-0.2
INFA	110.87	8.00	Informatica Corp.	95.81	6.44	7.2
IFMX	20.96	6.03	Informix Software Inc.	19.38	1.88	10.7
INTU	90.00	22.50	Intuit	59.25	5.56	10.4
JKHY	40.00	13.21	Jack Henry Associates	33.94	-2.31	-6.4
JDEC	48.31	10.87	J.D. Edwards & Co.	39.63	-0.13	-0.3
LGTO	82.50	15.06	Legato Systems Inc.	37.06	-1.94	-5.0
MACR	100.00	27.37	Macromedia Inc.	86.13	-1.75	-2.0
MANU	65.63	5.25	Manugistics Group Inc. (H)	65.63	9.63	17.2
MENT	18.50	7.75	Mentor Graphics	15.00	1.13	8.1
MSFT	119.93	73.53	Microsoft Corp.	112.94	16.25	16.8
NETA	51.00	10.06	Network Associates	35.69	0.25	0.7
GMH	141.00	45.31	Network General (H)	132.19	11.88	9.9
NOVL	44.56	16.06	Novell Inc.	32.88	2.94	9.8
ORCL	88.69	10.50	Oracle Corp. (H)	88.69	7.38	9.1
PMTC	35.93	11.68	Parametric Technology Corp.	26.88	-2.69	-9.1
PSFT	27.75	11.50	PeopleSoft Inc.	22.25	-2.38	-9.6
PIXR	50.62	33.00	Pixar	37.50	1.13	3.1
RATL	105.00	21.87	Rational Software Corp.	90.13	3.38	3.9
RHAT	151.31	7.00	Red Hat Inc.	59.00	-5.50	-8.5
QSFT	196.25	14.00	Quest Software	143.13	-15.03	-9.5
SAP	85.93	23.75	SAP AG	74.19	0.63	0.8
SCUR	29.62	2.25	Secure Computing Corp.	21.44	-1.31	-5.8
SE	44.50	17.93	Sterling Commerce Inc.	44.19	0.25	0.6
SSW	37.50	18.12	Sterling Software Inc.	35.63	0.94	2.7
SDRC	23.43	8.81	Structural Dynamics Research	13.94	-1.16	-7.7
SYBS	31.00	5.31	Sybase Inc.	23.50	-0.44	-1.8
SYMC	81.62	12.50	Symantec Corp.	73.88	2.38	3.3
SNPS	75.62	36.87	Synopsis	49.00	-1.00	-2.0
SCTC	28.37	7.81	Systems & Computer Tech.	24.00	1.50	6.7
BAANF	17.81	4.06	The Baan Co. N.V.	5.03	-0.22	-4.2
TIBX	147.00	5.00	Tibco Software Inc.	132.88	15.13	12.8
TSAI	48.12	20.25	Trans. Sys. Arch.	29.50	-5.38	-15.4
VRTS	174.00	13.55	Veritas Software Corp.	165.88	11.31	7.3
WIND	66.12	11.25	Wind River Systems Inc.	52.13	3.38	6.9
TELECOMMUNICATIONS CARRIERS UP 1.1%					
AT	91.81	55.87	Alltel Corp.	68.63	-1.19	-1.7
ANOW	31.25	11.00	Andrew Corp.	27.25	1.06	4.1
T	63.00	41.50	AT&T	58.25	4.75	8.9
BCE	135.00	38.31	BCE Inc. (H)	135.00	12.75	10.4
BEL	69.50	47.37	Bell Atlantic	59.38	0.38	0.6
BLS	51.31	34.93	Bell South	45.19	-1.13	-2.4
BRW	41.06	16.31	Cincinnati Bell Inc.	37.88	1.81	5.0
CMCSK	57.68	28.90	Comcast	39.88	-2.63	-6.2
CQ	37.06	15.37	Comsat Corp.	16.94	-0.44	-2.5
COX	58.37	32.78	Cox Communications Inc.	43.38	-3.13	-6.7
GSTRF	53.75	12.62	Globalstar Telecom. Ltd.	15.94	-1.44	-8.3
GTE	78.50	55.81	GTE Corp.	69.25	0.31	0.5
NXTL	165.87	27.43	Nextel Communications	158.00	10.00	6.8
SPOT	74.25	26.37	Panamsat	57.88	4.75	8.9
QCOM	200.00	8.89	Qualcomm	147.25	11.81	8.7
SBC	59.87	34.81	SBC Communications	43.44	-2.63	-5.7
FON	75.93	40.50	Sprint Corp.	58.63	-0.88	-1.5
TDS	137.00	50.25	Telephone and Data Systems	108.50	4.44	4.3
USW	81.50	51.50	US West	68.38	-1.44	-2.1
VIA	63.31	36.68	Viacom	58.38	2.44	4.4
WCII	60.75	19.00	Winstar Communications (H)	59.63	0.63	1.1
WCOM	64.51	40.62	MCI Worldcom Inc.	42.63	-1.31	-3.0
SERVICES UP 4.3%					
ACXM	35.93	14.56	Acxiom Corp.	32.44	0.31	1.0
ACS	53.00	31.00	Affiliated Computer Servs	36.19	-1.38	-3.7
AMSY	42.68	19.75	American Mgt. Systems	42.56	2.56	6.4
AUD	55.43	37.37	Automatic Data Processing	52.00	-1.88	-3.5
BSYS	69.00	41.37	Bisys Group Inc.	63.50	4.38	7.4
CATP	27.00	10.62	Cambridge Technology Ptnrs.	14.69	-0.88	-5.6
CEN	38.06	14.75	Ceridian	19.31	0.56	3.0
CBR	29.81	13.75	Ciber Inc.	21.56	0.25	1.2
CDO	57.25	11.25	Comdisco	50.88	3.13	6.5
CHRZ	27.12	9.25	Computer Horizons Corp.	18.38	-0.25	-1.3
CSC	94.93	52.37	Computer Sciences	80.44	6.56	8.9
DST	76.43	50.93	Dst Systems Inc.	59.13	3.31	5.9
EDS	76.68	45.43	Electronic Data Systems	73.50	10.25	16.2
FDC	54.25	38.87	First Data Group	45.94	2.25	5.2
FISV	40.75	24.12	Fiserv	36.13	3.19	9.7
IT	25.00	9.56	Gartner Group	20.81	6.50	45.4
KEA	35.00	17.25	Keane	26.75	0.50	1.9
NOC	52.06	21.75	National Data	25.13	-2.38	-8.6
PAYX	54.93	23.56	Paychex Inc. (H)	53.00	3.19	6.4
PER	43.00	15.31	Perot Systems Corp.	20.13	1.00	5.2
REGI	9.75	2.68	Renaissance Worldwide	5.88	-0.25	-4.1
REY	33.00	17.31	Reynolds & Reynolds	27.08	1.13	4.3
SFE	99.00	11.91	Safegard Scientifics (H)	91.56	-3.81	-4.0
SAPE	151.18	23.87	Sapient Corp.	97.25	-3.88	-3.8
SMS	73.50	35.50	Shared Medical Systems	63.00	0.69	1.1
SDS	41.93	16.87	Sungard Data Systems	38.88	0.94	2.5
SYNT	20.93	7.00	Syntel Inc.	15.69	0.81	5.5
TECD	44.68	14.50	Tech Data	31.31	4.38	16.2
TENF	71.06	17.00	TenFold Corp. (H)	71.06	13.58	23.6
TSS	21.62	14.12	Total System Services, Inc	15.94	-0.06	-0.4
TSAI	48.12	20.25	Transaction Sys. Architects	29.50	-5.38	-15.4
NETWORK UP 3.7%					
COMS	119.75	20.00	3Com Corp.	68.38	-1.75	-2.6
ADCT	58.93	17.18	ADC Telecommunications (H)	58.83	3.83	8.8
ANTC	61.25	18.62	Antec	44.81	1.31	3.0
BNYN	40.56	8.25	Banyan Systems Inc.	19.31	1.06	5.8
CS	50.87	7.18	Cabletron Systems	46.88	0.81	1.8
CNEBF	9.75	2.87	Call-Net Enterprises	5.16	0.03	0.6
CSCO	79.88	23.50	Cisco Systems Inc. (H)	79.88	12.41	18.4
ECIL	42.25	23.75	ECI Telecom	32.63	3.13	10.6
ENTU	150.00	16.87	Entrust Technologies Inc.	103.38	-4.13	-3.8
HRS	40.62	15.50	Harris Corp.	37.56	-0.50	-1.3
GMH	141.00	45.31	Hughes Electronics/GM (H)	132.19	11.88	9.9
ERICY	105.25	20.50	LM Ericsson	102.25	8.06	8.6

EXCH	52-WEEK RANGE		MARCH 24 2 PM	WK NET CHANGE	WK PCT CHANGE
JNPR	301.25	11.33	Juniper Networks Inc	275.38	18.38	7.1
LU	84.18	48.25	Lucent Technologies	64.69	-5.83	-8.C
MAOGF	17.37	1.43	Madge Networks	11.38	0.13	1.1
NCDI	9.62	3.87	Network Computing Dev	5.63	-0.88	-13.5
NWK	14.81	7.31	Network Equipment Tech.	10.63	-0.19	-1.7
NN	39.50	14.00	Newbridge Networks	34.19	2.38	7.5
NOK	227.06	66.53	Nokia Corp.	226.75	26.44	13.2
NT	142.00	26.93	Northern Telecom Ltd. (H)	142.00	13.75	10.7
PAIR	20.87	7.93	Pairgain Technologies Inc.	19.50	0.13	0.6
PCTL	15.21	3.25	Picturetel	10.63	0.25	2.4
SFA	154.00	24.50	Scientific Atlanta	137.00	7.25	5.8
TLAB	77.25	37.75	Tellabs Inc.	65.50	1.25	1.9
USW	81.50	51.50	US West	68.38	-1.44	2.1
VRLK	22.00	1.81	Verilnk (H)	19.00	2.50	15.2
WSTL	40.75	3.81	Westell Technology Inc.	37.13	1.13	3.1
SEMICONDUCTORS, CHIPS & EQUIPMENT UP 7.9%					
ADPT	63.56	19.00	Adaptec	47.88	2.00	4.4
AMD	60.00	14.56	Advanced Micro Devices	54.18	4.31	8.6
ALTR	99.25	24.21	Altera	94.44	8.44	9.8
ADI	94.00	12.18	Analog Devices (H)	91.13	13.81	17.9
AMAT	109.25	24.21	Applied Materials (H)	107.44	13.06	13.8
ASML	150.75	36.37	ASM Lithography Holding	131.50	4.00	-3.0
FCS	44.93	18.50	Fairchild Semiconductor Corp.	36.56	1.13	3.2
HRS	40.62	15.50	Harris Corp.	37.56	-0.50	-1.3
INTC	145.37	50.12	Intel Corp. (H)	142.69	14.81	11.6
KLAC	91.50	21.18	Kla Instruments	89.00	11.38	14.7
LLTC	111.50	41.75	Linear Technology	105.00	12.63	13.7
LSI	90.37	11.93	LSI Logic	85.31	8.13	10.5
MXIM	74.50	19.93	Maxim Integrated Products (H)	72.50	5.75	8.6
MU	139.75	34.25	Micron Technology (H)	139.19	14.81	11.9
MOT	184.62	65.37	Motorola	164.63	14.94	10.0
NSM	85.93	8.87	National Semiconductor	65.25	2.63	4.2
STM	221.62	40.25	SGS-Thomson Microelectron.	200.13	18.38	10.1
SLR	49.00	20.25	Solectron Corp.	44.06	0.25	0.6
TER	93.43	21.84	Teradyne	90.50	5.44	6.4
TXN	199.56	43.00	Texas Instruments	179.75	11.25	6.7
JOSU	153.42	10.68	Uniphase	133.50	1.81	1.4
VTSS	115.68	20.37	Vitesse Semiconductor Corp	94.75	3.69	4.0
XLNX	85.87	16.43	Xilinx	83.75	9.56	12.9
COMPUTER SYSTEMS OFF -2.1%					
AAPL	150.37	32.00	Apple Computer Inc. (H)	138.50	14.00	11.2
ASPX	19.00	3.87	Auspex Systems	13.38	-2.00	-13.0
8EOS	39.56	3.28	Be Inc.	20.25	-1.00	-4.7
CPQ	35.43	18.25	Compaq	28.50	-1.50	-5.0
DELL	59.68	31.37	Dell Computer Corp. (H)	57.94	1.75	3.1
GTW	84.00	28.37	Gateway 2000 Inc.	57.75	-0.44	-0.8
HWP	155.50	63.37	Hewlett-Packard Co.	144.75	4.44	3.2
HIT	164.50	59.93	Hitachi Ltd.	115.31	-5.31	-4.4
IBM	139.18	81.50	IBM	119.88	9.13	8.2
MUEI	20.68	9.00	Micron	16.13	-1.44	-8.2
MOT	184.62	65.37	Motorola	164.63	14.94	10.0
NATI	50.00	17.16	National Instruments Corp.	50.00	2.88	6.1
NCR	54.56	26.68	NCR	44.13	-0.25	-0.6
NIPNY	141.00	46.62	NEC (H)	127.69	-12.31	-8.8
PRCM	89.75	3.43	Procom Tech Inc.	60.00	-7.75	-11.4
SGI	18.87	6.87	Silicon Graphics Inc.	11.94	-0.94	-7.3
SNE	314.75	73.12	Sony	242.00	-5.94	-2.4
SUNW	101.93	23.53	Sun Microsystems	100.75	5.50	5.8
TRCO	22.75	1.53	Tricord Systems	11.50	-2.75	-19.3
UIS	49.68	20.93	Unisys	25.88	-1.00	-3.7
INTERNET OFF -0.1%					
AMZN	113.00	41.00	Amazon.com	73.31	8.06	12.4
AOL	95.81	38.46	America Online	71.81	8.00	12.5
ATHM	99.00	26.75	@home Corp.	31.81	2.19	7.4
CKFR	125.62	23.12	Checkfree	62.25	-10.69	-14.7
CYCH	24.00	6.68	Cybercash Inc.	14.06	0.31	2.3
EBAY	244.75	70.28	eBay Inc. (H)	244.75	30.75	14.4
ETYS	86.00	11.06	eToys Inc. (L)	11.19	-0.69	-5.8
EGRP	72.25	19.18	ETrade Group Inc.	32.06	2.81	9.6
LCOS	93.62	28.56	Lycos Inc.	71.06	-1.06	-1.5
OMKT	65.50	11.18	Open Market Inc.	36.50	-6.88	-15.9
OTEX	60.62	9.50	Open Text Corp.	41.50	0.25	0.6
PCLN	165.00	16.00	Priceline.com Inc.	91.50	1.69	1.9
PRGY	45.87	14.00	Prodigy Communications	16.00	-2.75	-14.7
PSIX	60.93	15.53	PSINet Inc.	38.88	-11.00	-22.1
RSAS	93.06	14.25	Security Dynamics	69.09	-2.78	3.9
SPYG	93.25	8.62	Spyglass Inc.	72.25	-2.38	3.4
WINK	75.00	6.00	Wink Communications Inc.	37.13	0.00	0.0
YHOO	250.06	55.00	Yahoo Inc.	193.13	20.13	11.6
STORAGE & PERIPHERALS UP 4.2%					
AOPT	63.56	19.00	Adaptec Inc.	47.88	2.00	4.4
APCC	41.37	13.09	American Power Conversion (H)	39.44	5.69	16.9
CANNY	46.25	21.00	Canon Inc.	37.88	2.38	-5.9
OBD	30.68	19.68	Diebold Inc.	28.19	2.06	7.9
EK	79.81	53.31	Eastman Kodak Co.	57.00	-0.69	-1.2
EMC	140.75	46.93	EMC (H)	140.75	12.81	10.0
IOM	6.37	2.87	Iomega	4.00	-0.19	4.5
MXTR	14.00	4.25	Maxtor Corp.	14.00	1.25	9.8
NTAP	124.00	9.84	Network Applinace Inc.	100.19	3.31	3.4
LXK	135.87	42.09	Lexmark Int'l. Group, Nc. (H)	125.56	3.44	2.8
SEG	73.75	25.12	Seagate Technology	71.50	3.25	4.8
STK	35.25	11.50	Storage Technology	14.25	0.81	6.0
TEK	71.75	17.56	Tektronix	67.94	-0.44	-0.6
XRX	63.93	19.00	Xerox	26.88	1.25	4.9

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NEWS

3Com

ey, and now the equipment is obsolete," said Wilson.

The upgrade path for Core-Builder users will be to a switch called BlackDiamond from Extreme Networks Inc., also in Santa Clara.

"I'm not familiar with Extreme," Wilson said.

More perplexed than upset was systems administrator Scott Ivers at pet food company Royal Canin USA in St. Louis. Ivers set up a network using 3Com's SuperStack II Ethernet switches and said he

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Changes at 3Com

3Com will exit the large enterprise market and sell networking equipment to small and midsize businesses and consumers.

CoreBuilder LAN switches - Production ends June 30. Core-Builder will transition to Extreme Networks. A 70% discount on Black-Diamond switches will be offered to existing CoreBuilder customers.

....

PathBuilder and NetBuilder switches and routers - Production ends June 30

....

Analog modem business - To be transferred to Natsteel Electronics Ltd. (NEL) and Accton Technology Corp. alliance by May 30

---

has been impressed with how easy the network is to manage. He said his next move would have been to install a Core-Builder switch.

"Does this mean Cisco takes over?" Ivers asked. "I've never heard of Extreme."

Brian Dahill, a network support analyst at St. Luke's Hospital and Regional Trauma Center in Duluth, Minn., said he wasn't thrilled about the deal either but had heard from an Extreme representative who would be visiting the St. Luke's site this week. "I really hate to think about changing," he said.

3Com Senior Vice President Edgar Masri said he understands that users are concerned. But he noted that CoreBuilder products have two or three years of useful life before their users will need to move to the next generation of switches. "They're certainly not obsolete," he said. Moreover, Masri said, 3Com will continue to support discontinued products for up to five years.

Masri also said the network management capabilities of the CoreBuilder 9000 would be ported to Extreme's Black-Diamond line.

Not all users were concerned. Ram Prabhu, corporate telecommunications manager at Millipore Corp. in Bedford, Mass., which uses 3Com's high-end CoreBuilder 9000 network switch, said that representatives from 3Com and Extreme had contacted him

and that he didn't anticipate any major problems going forward.

Nigel Oakley, 3Com's vice president of marketing, said the firm would now focus its efforts on small to midsize business networks and home networks and advance its voice-over-IP telephone business, which enables users to send voice conversations over data lines. Like 3Com's spin-off of Palm Inc., the restructuring will allow the company to fo-

cus on markets where it sees the best growth, said Oakley.

3Com has been "largely unsuccessful" in competing with Cisco Systems Inc., Nortel Networks Corp. and even Cabletron Systems Inc. in the LAN switching market, said Esmeralda Silva, an analyst at International Data Corp. in Framingham, Mass. Last year, she said, 3Com had a 4% revenue share of the chassis/modular business for local-area networking, while Cisco's share

was 63%. But 3Com has held its own in the fixed-port LAN sector, with a 25% revenue share, she said.

Giga Information Group Inc. analyst Stan Schatt in Cambridge, Mass., also said 3Com's restructuring is an acknowledgment that CoreBuilder was never able to crack into Cisco's market.

"The jury is still out on this," Schatt said. "It's an extremely major reorganization. One day later, 3Com is very different." ◗

Auto Dealers Link Up To Launch Web Site

Partnership targets 19,500 NADA dealers

BY DEWAYNE LEHMAN

THE REVVING UP of yet another automobile-related Web partnership promises to stiffen the competition for online car sellers. But analysts disagree about how much mileage the dealers involved will get.

The National Automobile Dealers Association (NADA) has partnered with Seattle-based Cobalt Group Inc. to launch NADAdealers.com. The

site will provide a search capability to enable users to locate particular models and dealers by location and will list dealer invoice prices, the companies said. Prices will be negotiated directly with each dealer.

Cobalt Group, which specializes in building and hosting automotive-related Web sites, will jump-start the new venture by bringing its 6,000 dealer clients and their 500,000 new vehicles to the site when it launches in May, said Mike Morrissey, a spokesman for NADA in McLean, Va. The goal is to get most of the association's 19,500 dealers to sign on. There are 22,000 new-car

dealers in the nation, he said.

Dealers who use Cobalt services will be included on the site for free; those who don't can join for $150 per month, said Cobalt spokeswoman Amy Anderson.

A high level of dealer participation on the site would make NADAdealers.com competitive with other online car-selling sites, said analyst Kevin Prouty at AMR Research Inc. in Boston.

"NADA's stamp of approval on what Cobalt is doing adds a lot of credibility," he said. "It's going to depend on how well NADA works with Cobalt" in signing up dealers. ◗

Supply Chains

inventory management system to a big group of external users.

Scott Smith, manager of Ace's inventory department, also wants to tread carefully to make sure the first participants don't find collaboration a waste of time and money.

"I have a sense of responsibility [to the manufacturers] because I'm kind of pitching them on this idea," he said at a supply-chain conference organized by IBM last week.

Ace's example illustrates the cautious steps most users are

taking toward Web-based collaboration between different companies on key business tasks such as demand forecasting and production planning.

Supply-chain collaboration was a hot topic at the conference. And for good reason: Pioneering companies expect to reap substantial business benefits by using the Internet to better automate their supply-chain activities.

Marcia Meyer, president of Petsmart Inc.'s product sourcing unit, said the Phoenix-based pet supply retailer has used Web-based collaboration with manufacturers to increase the number of items it sells by 40%, without expanding its

buying staff. More than half the overseas trips that buyers used to take have been eliminated, Meyer said. And new products are being developed faster because specifications and designs can be exchanged via the Web, she added.

But several other users said they still have technology or business issues to work out before they can take full advantage of collaboration.

For example, Lockheed Martin Co.'s missile division last year launched a collaboration project with five key suppliers on one of its missile programs. Randy Burch, a product development manager at the Dallas-based unit, said the company

hopes to reduce manufacturing cycle times by up to 15%.

But for now, missile designs and production plans have to be extracted from Lockheed Martin's systems and converted into separate electronic documents. Direct Web-based collaboration won't be possible until the SAP AG supply-chain software used by the missile unit gets upgraded later this year, Burch said.
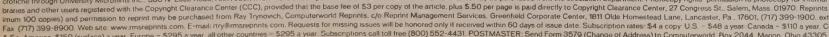
Lockheed Martin is waiting for that to happen before it starts implementing collaborative approaches across all the missile division's product groups, he added.

The Quaker Oats Co. has made improving its supply-

chain management a top corporate priority since 1993, said Karen Alber, director of business solutions at the Chicago-based food manufacturer.

But she added that Quaker Oats is only now starting to look at replacing its old business systems with more integrated enterprise resource planning applications that should make supply-chain data easier to find for end users.

The company wants to tap technology to do more synchronized planning with retailers as well as its suppliers, Albers said. "But we have to get our own internal information in order before we could head down that road," she added. ◗

FRANK HAYES/FRANKLY SPEAKING

Making the grade

IT'S ANOTHER FAILING REPORT CARD for IT. Last week, The Boston Consulting Group released a study that says, in effect, we're butchering our enterprise projects. You know the ones: ERP and customer relationship management, supply chains and e-commerce. Two-thirds of our big projects were pegged as unsuccessful overall. That's despite the fact that more than 40% finished on time and on budget and that 60% of the executives who signed off on the projects said they were worth the cost.

But when the projects were scored for value creation, cost-effectiveness, financial impact and business goals, only 33% were deemed successes.

Actually, there's plenty of good news in this study. A few years ago, surveys said that only 16% of software projects — that's one in six — were completed on time and on budget. Today, we're up to 41%. That's a huge improvement.

And a few years ago, a third of all big software projects were canceled outright. That kind of failure used to be routine. Today, an ERP project that completely crashes and burns creates headlines and lawsuits. That kind of failure is no longer accepted. We've come a long way.

But you know we're going to get kicked around for these new numbers. Never mind that the rules have been changed and that the bar has been raised. Never mind why those projects didn't "succeed." IT will get stomped on for not delivering the goods.

So why not? What's missing? The management gurus at Boston Consulting think we need better up-front analysis, clearer strategic vision and tighter project management. Yeah, we've all heard that before.

But maybe it's simpler than that. Maybe what's missing from our enterprise projects is the rest of the enterprise.

Look, these days our organizations don't just need to support business functions with technology. That's what we used to deliver. We can spec out a business function. We can turn it into code. We know how to do that.

But today, our organizations need to run the whole business on technology — and run it faster and better and let everyone work at a higher level and kick everything up a gear.

That's not like any application we've ever

How can we keep from failing at our enterprise projects?

delivered before. That's technology as a business platform.

Great idea, huh? Of course, we don't have the products to deliver that kind of platform. Or the technical expertise. Or, most important, the in-depth knowledge of the whole business and the connections with users and the clout in the executive suite — all things we'd need in order to create an IT business platform.

We can hammer on vendors for the products. Maybe we can rent the technical expertise from consultants. But even when those are available to transform the business — that's what these enterprise projects are supposed to do, right? — we've got to have the rest of the business on the project, too.

And that's a tough sell, inside *and* outside the IT shop. The businesspeople think it's our job. They don't want to be bothered. And lots of IT people don't want users anywhere near what we do.

But we can't do it without them. We've got to have their people for testing and feedback. And their meeting time to hammer out the shape of new business processes. And their knowledge of what works in the business and what doesn't, what's fine and what needs fixing. And their commitment and determination to get it right.

So, yeah, let's make sure we've got good analysis and strategic vision and project management. That's a start. But then let's make sure we've got the rest of the enterprise hip-deep in our enterprise projects, too.

That's the only way we can keep from failing again. ▶

Hayes, Computerworld's staff columnist, has covered IT for more than 20 years. His e-mail address is frank_hayes@computerworld.com.

The 5th Wave

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"I tell you, it looks like Danny, it sounds like Danny, but it's NOT Danny!! I think the MAC has created an alias of Danny! You can see it in his eyes - little wrist watch icons!"

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